

# Special Articles: MOSQUITO CONTROL METHODS. STATE HYGIENIC LABORATORY.

## CALIFORNIA ~~STATE~~ BOARD OF HEALTH.

*California, Dept. of Public Health*  
**MONTHLY BULLETIN**

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## REGULAR MEETINGS

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The California State Board of Health meets regularly the first Saturday of each month, but the stated meetings of January, April, July, and October constitute the quarterly meetings required by law to be held at the Capitol of the State.

By courtesy of the University of California the Food and Drug Laboratory and the Hygienic Laboratory are located in University buildings at Berkeley, California.

Address all communications to the

**SECRETARY, Sacramento, California.**



# JULY BULLETIN.

## THE SECRETARY'S ANNOUNCEMENT.\*

WILLIAM F. SNOW, Secretary.

The State Board of Health begins with this issue the sixth volume of its monthly bulletin. In the first number of the fifth volume the Board outlined its purpose in publishing the bulletin, as follows:

*First*—To distribute in an accessible form the statistical data gathered every month relative to births, marriages, and deaths.

*Second*—To add to these facts, such explanatory comments and statements as may serve to make the statistics more readable.

*Third*—To print short special articles on public health subjects which are of importance to the general welfare of the State.

During the year the size of the bulletin and the range of its subject-matter has been increased. This has resulted in greatly enlarging the circulation and in the development of a heavy correspondence on general health conditions throughout the State. In order to provide for the continued growth of this important phase of the Board's work without restricting its administration duties, a new bureau on public health information has been authorized by the Board.

### THE BUREAU OF PUBLIC HEALTH INFORMATION.

With this issue the Secretary closes his personal editorship of the bulletin. Hereafter this work, together with the editing and distributing of information-pamphlets on tuberculosis, the personal correspondence on this and other health topics, newspaper correspondence, and the development of lecture schedules and exhibits, will be under the direction of Dr. Raymond Russ and assistant director Herbert Coolidge.

Experience everywhere shows the greatest difficulty in effecting sanitary reforms to be lack of exact knowledge of practical things to do. The Board hopes, through the systematic development of this new bureau, to greatly increase the popular knowledge of practical sanitation and hygiene.

### REORGANIZATION OF THE HYGIENIC LABORATORY.

In May, 1910, Dr. A. R. Ward resigned as director of the Hygienic Laboratory to accept an appointment in the Philippines. Dr. Wilbur A. Sawyer, a physician of experience and a member of the medical faculty of the University of California, has been appointed his successor. Dr. Sawyer will have as his chief assistant Dr. C. B. McGlumphy, a graduate of the University of Michigan, who, prior to acceptance of the position with this Board, was research assistant to Professors Vaugh and Novy and in charge of the Pasteur Institute for that State.

\* Explanatory résumé of recommendations in the annual report of the Secretary, which were favorably acted upon by the Board at its meeting July 9, 1910.



During the past year the Board has maintained a branch laboratory in Los Angeles for the benefit of Imperial, San Diego, Orange, Riverside, San Bernardino, Los Angeles, Ventura, and Santa Barbara counties. This laboratory has been made possible through the generous coöperation of Dr. Stanley P. Black, a pathologist possessing wide experience and the unquestioned confidence of the medical profession of California. Dr. Black will continue as director of the substation for the ensuing year.

On August 1st the Board will open a second branch laboratory at Fresno to provide for Kern, Kings, Tulare, Fresno, Madera, Merced, and Mariposa counties. Dr. C. W. Bonyngue will be transferred from the position of chief assistant in the central laboratory to the directorship of the new substation.

The Board believes that the judicious development of branch laboratories as field stations for the prompt investigation and stamping-out of epidemics, will solve the difficult problem of compassing California's rugged topography and vast acreage.

#### BUREAU OF EPIDEMIOLOGY.

The epidemiological work of the Board has never been developed adequately. Each year Californians see the onset, crisis and disappearance of many outbreaks of many diseases. A few persons die, many are grievously ill and recover, a little cleaning up is done, even a few permanent gains in the sanitation of cities occur—then comes the heavy inertia of public indifference. Only in rare instances is any persistent attempt made to trace the origin of epidemics at the time, when not only could a saving of life be effected, but when information could be gained which would be invaluable in checking future appearances of disease.

The Board of Health has done what it could to aid local health officials to investigate epidemics, and the Secretary has spent much of his personal time in this phase of the work. Furthermore, the Board has been most fortunate in commanding for this work the services of Mr. N. D. Baker, a graduate of the department of sanitary engineering of the University of California. The biennial report will show good progress, but much remains to be done. On the first of March, 1910, the Board detailed Mr. Baker to make an investigation of the sanitary conditions of California summer resorts. Reinspections are now being carried out by President Regensburger, and the lumber and other large temporary camps are being inspected and studied. Sanitary surveys will constitute a new feature of this division of the Board's work for the coming year. Wherever epidemics of water-borne diseases appear, or the mortality returns over a period of years indicate the need for investigation, a careful sanitary survey will be made. In unsewered towns, and those without adequate water supplies, an engineering report will be made. This report will cover the feasibility, estimated cost, and tentative engineering drawings of proper sewer and water plants. These reports will be used at the discretion of the Board in aiding the general efforts of communities to incorporate or form sanitary districts and vote bond issues to cover the proper detailed study and construction of sewers and water systems. The Board believes this work will be productive of accelerated progress in permanent public health improvement.



Fortunately for California, the grave and puzzling epidemiological problem of bubonic plague transmission has been undertaken by the Federal Government. The Board now has regularly on its staff an expert on rabies, and the epidemiology of this disease, which is new to California, will be worked out. The appearance of poliomyelitis makes another demand which the State Board should promptly meet. Arrangements have been made with a number of physicians who are trained observers to gather the epidemiological data of the cases in their vicinity, and the Board will endeavor to supplement this preliminary work with careful studies of the data thus obtained.

#### MOSQUITO CONTROL WORK.

The State Board of Health has had no funds with which to prosecute a campaign against malaria, but California has had the good fortune to appoint as a member of the University of California faculty a scientist, who is well informed, practical, energetic, and possesses rare ability as an organizer. This man, Professor W. B. Herms, has been largely instrumental in bringing about several well-planned, adequately financed, effective mosquito-eradication campaigns covering a large acreage of valuable fruit, farm, and mining lands. This work has the hearty endorsement of the Board, and in so far as may be possible, aid will be extended to Professor Herms and the citizens with whom he is coöperating. From an economic point of view malaria is one of the most wasteful of California's preventable diseases.

Anti-fly campaigns are being prosecuted vigorously in many parts of the State. Here again the State Board plans to extend its aid in every way open to it during the coming year. The coöperation between the California press and the Board in bringing the need for fly and mosquito wars prominently before the people has done much toward preparing the way for the practical campaigns of the present summer. Through the newly organized bureau of public health information, this work will be continued.

#### THE CALIFORNIA PUBLIC HEALTH LEAGUE.

During the year plans have matured for a clearing-house for California public health associations. This movement is fraught with far-reaching possibilities, if its pioneer board of directors exercise tact and energy in developing its field of activities. It is largely a laymen's organization, is entirely independent of the State Board of Health, and exists for the purpose of coördinating the efforts and preventing wasteage of the many organizations striving directly or indirectly to improve the public health. It has been named the California Public Health League, and will replace the old California Public Health Association. The State Board believes the new league has an important mission, and will extend its full coöperation. During the year space will be granted in this bulletin for recording the progress of this movement.

#### THE CALIFORNIA HEALTH OFFICERS CONFERENCE.

With the transition of the California Public Health Association to the broader Public Health League, the State Board has been petitioned to call an annual conference of public health officers in accordance with the policy of many Eastern States, which require by law all



counties and cities to send their officers to such a conference. It has been decided to issue a call for a meeting to be held in San Diego simultaneously with the annual meeting of the California League of Municipalities, which last year provided for a department of health officials. At this meeting a tentative plan for a permanent conference of health officers will be discussed and possibly adopted.

#### COÖPERATION WITH COUNTY AND LOCAL HEALTH OFFICERS.

Most cordial relations have been maintained between the local health boards of the State, the county health officers, and the State Board of Health. Many rulings have been asked on matters of quarantine, health ordinances, and practical solutions of local administrative problems. During the coming year the Secretary and the Board's Attorney have been instructed to make a comparative study of existing health ordinances of the cities and counties of the State with the purpose of aiding local officers to work for uniformity of regulations and administrative methods.

#### THE STATE FAIR AND THE SANITATION EXHIBIT.

The sanitation exhibit was taken from the road on March 1st because of lack of funds to provide demonstrators. The Southern Pacific Railroad Company has very generously indicated its willingness to resume the transportation and housing of the exhibit if it is desired to again send it out. Upon applications of the San Francisco Tuberculosis Association and the Milk Improvement Association, the portions of the exhibit dealing with tuberculosis and with milk supply have been loaned to these associations to be used as a nucleus in building up permanent exhibits for their societies.

The Board has now made tentative arrangements with Secretary Filcher of the State Fair management for space for demonstrations and exhibits of the work being done by the various public health organizations. It is proposed to show through models, photographs, charts, and lantern-slide talks, the actual work being done in (1) a tuberculosis clinic, (2) a tuberculosis sanitarium, (3) a certified dairy, (4) a mosquito extermination campaign, (5) a squirrel extermination campaign, etc. The Board believes a most interesting and instructive exhibit can be developed, and in the event of success expects to coöperate with the California Public Health League in carrying the exhibit through a winter circuit of the larger population centers.

#### NEW QUARTERS FOR THE FOOD AND DRUG LABORATORY.

The University of California has very generously provided excellent quarters for the State Board's food and drug work in the new laboratories just completed. This will result in the work being done with greater convenience and economy of time. No changes in the personnel or policy of this division have been decided on by the Board.

#### THE ADMINISTRATIVE STAFF.

The steadily increasing work of the State Board of Health has placed a heavy responsibility on the limited staff in the Secretary's office. The Board's attempt to complete the returns from birth registration; its effort to coax morbidity statistics into existence; its determination



to make the vaccination law effective; its investigations and warnings concerning stream-pollution; all this special correspondence, typing of reports, filing of data, etc., in addition to the routine administrative work of the office, has made the past year a hard and busy one for all.

Mr. John F. Leinen has been made chief clerk and placed in charge of the administrative offices of the Board.

Many minor plans for making the work of the Board more effective are under consideration, and will be announced from time to time as they may be tried and found successful.

## HOW TO CONTROL MOSQUITOES, WITH SPECIAL REFERENCE TO ANOPHELES.

By WILLIAM B. HERMS, University of California.

The mosquito is one of the most formidable foes of mankind. Armies have been routed by this insect, nations have suffered irreparable loss, and the progress of civilization has been stayed in many instances. Perhaps not in all cases has the mosquito been recognized as the foe directly at the time, but now we know that the depredations due to malaria and yellow fever, vital enemies to the advance of civilization, can be averted by declaring war to the death on this tiny insect. Not only is this insect an enemy because of its vital relation to the diseases mentioned and others not enumerated, but also because its bite may result in serious complications, and is annoying to say the least. More than one camping party, whether on business or pleasure, has had to beat a hasty retreat due to the bites of numerous mosquitoes. Animals used in logging camps are often so plagued by these creatures that operations must cease until a more favorable season.

The value of real estate is greatly affected by the mosquito. Situations otherwise ideal for summer homes are made uninhabitable by the presence of this pest. Malaria is a great drawback to colonists,—great areas offering the most fertile soil and the best of climate are made of little value because of this disease. Employers, who hire men full of malaria, whether to work in the wheat field, the orchard, dredging, or construction, are paying for only half a man.

Now these conditions are largely, if not absolutely, preventable. The marsh land can be drained in most cases or the surplus moisture run into deeper channels and the land put under cultivation. Thus many acres of land have at the same time been made profitable through an effort to rid such territory of mosquitoes. This applies also to the large areas of salt marsh. As far as science knows malaria is solely transmitted by mosquitoes belonging to a specific group, namely, *Anopheles* and related genera; thus the control of malaria depends on the control of mosquitoes.

California is a state noted for its healthful climate, and its natural resources in this respect are tremendous. Careful study and extensive travel in this vast empire of the Pacific have impressed me with its wonderful natural conditions conducive to good health. The conservation and protection of California's health resources is a problem of great moment and malaria is an enemy that must be dealt with. This is a disease not indigenous to our soil, nor to our sunshine, nor to our



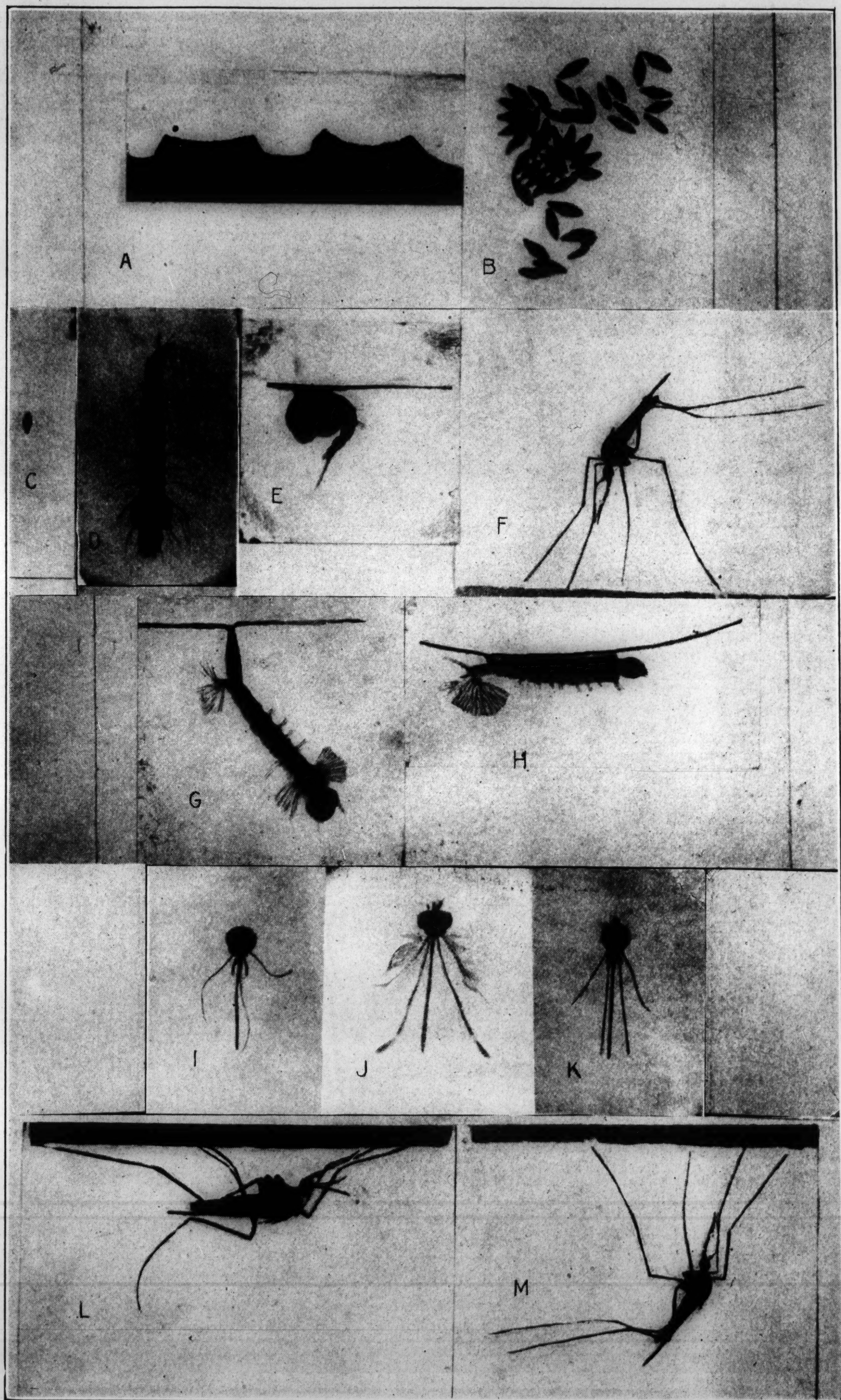


PLATE I. See legends on page opposite.



luscious fruit, nor to the clear, cool waters that flow from the Sierras,— but an alien that has crept in stealthily and has occupied the length and breadth of these fair valleys. California is not the only state that has suffered from malaria, but it will not be far behind and not found wanting in a crusade against this foe. The great rivers of the San Joaquin and the Sacramento, with their areas of swamps and the misuse of the blessings of irrigation, form breeding grounds for mosquitoes, but these conditions can be corrected at least in the vicinity of human habitations.

The following quotation taken from an editorial needs no comment: “How good the city would be if this one fault (malaria) could not be laid against us! Like the ostrich, who hides his head in the sand and thinks his whole body is concealed, we may say there is no malaria. But we deceive no one but ourselves. Not that malaria is worse in ——— than elsewhere in the Sacramento and San Joaquin valleys. We do not believe that it is. But this is not the point. There is no excuse whatsoever for the disease existing. There are two kinds of boosting, both of which are good. There is the boosting that brings good things here, and the boosting that boosts bad things away. Let us not in our enthusiasm for the former forget altogether the importance of the latter. \* \* If we emulate in any measure the persistency of the Roman, if we adopt as our slogan, ‘Malaria must go!’ the greatest drawback to the progress of our city will be overcome.” And inside of six months after operations had begun there comes this announcement from a resident physician in another section, “Where I had twenty-five cases of malaria last year, I have only one this year, and this one outside the protected area.”

This can only be accomplished by a systematic, rational campaign based on a knowledge of the habits and life history of the responsible organisms. Many campaigns have terminated in fiasco and deserved ridicule through lack of this proper knowledge.

#### DEVELOPMENTAL FEATURES.

The mosquito must have water, if only a thimbleful, in which to develop. In some species the eggs may be laid in mud, but in nearly all cases the eggs are deposited on the surface of the water, either in boat-shaped masses (Plate IA) of 250 to 750 eggs (Culicine); or singly, usually in geometrical figures (Plate IB) of 25 to 125 eggs per female (Anopheline). These eggs hatch in from twelve to forty-eight hours. The larvæ are called *wrigglers*. These creatures are very tiny at this time and hardly visible to the naked eye, but in a few days they become conspicuous objects in pools and receptacles filled with water. The

#### PLATE I.

- Figure A. The egg-boat of the Culicine mosquitoes (250 to 750 in each raft).
- Figure B. Anopheline eggs (after Howard) often deposited in geometrical figures.
- Figure C. Single egg of malaria-bearing mosquito.
- Figure D. Larva or wriggler of the malaria-bearing mosquito.
- Figure E. Pupa or tumbler of the malaria-bearing mosquito.
- Figure F. Adult of the malaria-bearing mosquito.
- Figure G. Position of the Culicine wriggler in water.
- Figure H. Position of the Anopheline wriggler in water.
- Figure I. Head of female Culicine mosquito.
- Figure J. Head of male mosquito of either group.
- Figure K. Head of female Anopheline mosquito.
- Figure L. Characteristic attitude of Culicine mosquito resting against ceiling.
- Figure M. Characteristic attitude of Anopheline mosquito resting against ceiling.



wrigglers, most commonly seen, hang from the surface of the water with their heads down as shown in the figure (Plate Ig). This is the characteristic position of the Culicine (*Culex*) species. Less conspicuous wrigglers, quite different from the above and usually remaining unseen unless attention is called to them, lie parallel with and closely adherent to the under surface of the water film (Plate Ih). These are the larvæ of the Anopheline (*Anopheles*) species, or malaria bearing mosquitoes. During this and the following stage these organisms are air breathing, notwithstanding their aquatic habitat. By keeping the mosquito *wiggler* under water it can be drowned like any other air breather. The reason then that *wrigglers* are found at the surface of the water is that they are getting air through the water film by means of their rather conspicuous siphons or air funnels. The reason for placing oil on the surface of the water is now evident.

The *wrigglers* secure food by browsing on the algæ and other tiny plant life growing on the sides and bottom of the pool, or by feeding on smaller organisms at or near the surface of the water. Thus it is not difficult to observe the movements of these creatures as they squirm about while breathing at the surface or wriggle down to the bottom, their large, well developed jaws nibbling the while. Growth, during this stage, is greatly influenced by temperature. In summer, this stage may last from seven to eight days but may be as long as six weeks in winter. Many of the Culicine mosquitoes, appearing early in the spring in California, have their origin from overwintering *wrigglers*. Of course, many mosquitoes hibernate during the winter under buildings, beneath débris, or in other protected situations, coming out in the spring, or even on warm winter days, to bite and breed. The *Anopheles wrigglers* always require a third to half more time to develop; thus if *Culex* requires ten days, the former will require about thirteen to fifteen days. But the writer has never found the *wrigglers* of this genus during the winter months, and not until the spring is pretty well advanced; even then their growth is quite slow. The adults of this genus, which are often seen in numbers as early as March, are hibernated individuals and upon them depends the future generation. The next state after the larva or *wiggler* is the pupa or tumbler, also aquatic, but provided with a pair of air trumpets situated far forward as compared with the single breathing tube of the larva. The tumblers of the two groups of mosquitoes do not differ very greatly, though the *Anopheles* are more strongly arched and the head end is longer than in *Culex*. This stage is comparatively short, only two to four days being thus spent, when the skin bursts and the winged insect emerges, balances itself on the empty shell, spreads its wings and is soon off to find food. Undoubtedly many mosquitoes never have the privilege of sucking the blood of warm blooded animals, but where this is available the female mosquito fills herself full and the development of eggs proceeds. Laboratory observations prove that blood sucking is not absolutely necessary for the development of eggs.

We have now seen that the Culicine mosquitoes require in midsummer at least ten days for their complete development from the egg to the adult. Fifteen to eighteen days seems to be the shortest time for the *Anopheles* to pass through this process. In early spring the total time is correspondingly longer, owing to the lower average temperature. Observations show that the newly emerged female insect lives



on an average from thirty-five to forty days during summer. The male only lives three or four days, rarely longer even under the best conditions. The time here given for the female is for summer conditions; in hibernation (a state of inactivity) the mosquito may pass the entire winter of several months and appear in the spring to propagate its kind.

#### THE MOSQUITO AND MALARIA.

The blood sucking habit (the males do not possess this habit) transmits consequently such parasites as may inhabit the blood. The causative organism of malaria is a one-celled animal parasite inhabiting the red blood corpuscles of man during a period of its development, the non-sexual or sporulating stage, while curiously enough the sexual stage can only be passed as far as known within the body of a female mosquito of the Anopheline group. Therefore, this insect is essential to the propagation of malaria, which disease must of necessity die out in the body of the human being (since there is no sexual reproduction there) unless there is a renewed inoculation through the mosquito. Just why the malaria parasite does not develop within the bodies of Culicine mosquitoes and other blood sucking insects is as yet a matter of conjecture. A study of the habits and environmental relationships of this parasite will explain why this organism does not exist in an active state in impure water, foul air, the soil, overripe fruit, stale beer, etc.

The sexual development of the malaria germ within the mosquito requires several days (six or seven) before it can be transmitted and produce the disease in another or reinoculate the same person. Observations show that this period is prolonged in early spring by the lower average temperature retarding the development of the parasite. After inoculation a period of from seven to ten days transpires before the parasite will again be found in the blood of the patient.

These periods, which we may call the time factor, vary considerably according to the prevailing temperature and the physiological condition of the person affected. Another feature, dependent on the variety of the parasite, is the time elapsing between the chills or shakes. In some varieties the time between the paroxysms is seventy-two hours, every three days, and in others forty-eight hours or every other day.

#### TO DISTINGUISH ANOPHELES.

The principal differences between the Anopheline and Culicine mosquitoes are illustrated in the figures and consist in the relative length of the palpi and the proboscis, and the difference in position when resting. The "song" of Anopheles is also less audible than Culex, and usually spotted wings indicate the former, though there is a relatively common California species, *Theobaldia (Culex) incidens*, that has spotted wings.

Examining the head of a female mosquito five prominent extending organs may be seen, the threadlike antennæ or feelers, the prominent proboscis or beak, on either side of which are situated structures called palpi having their origin at the base of the beak. In Culicine mosquitoes these palpi are less than half as long as the beak (Plate II); in Anopheline (malaria bearing) these organs are nearly as long as the latter. (Plate IK).



The resting position of the Culicine mosquitoes is with the body parallel to the base, and the proboscis at an angle of  $45^{\circ}$  to  $90^{\circ}$  with the body (Plate IL), while the Anopheline mosquito rests with its body at an angle of  $45^{\circ}$  or more with the wall or ceiling and the beak and body nearly on the same line. (Plate IM).

WHERE MOSQUITOES BREED.

As has already been mentioned water is absolutely necessary for mosquito breeding. The situation varies considerably for the species. Places suitable for Culicine mosquitoes are not always suitable for the

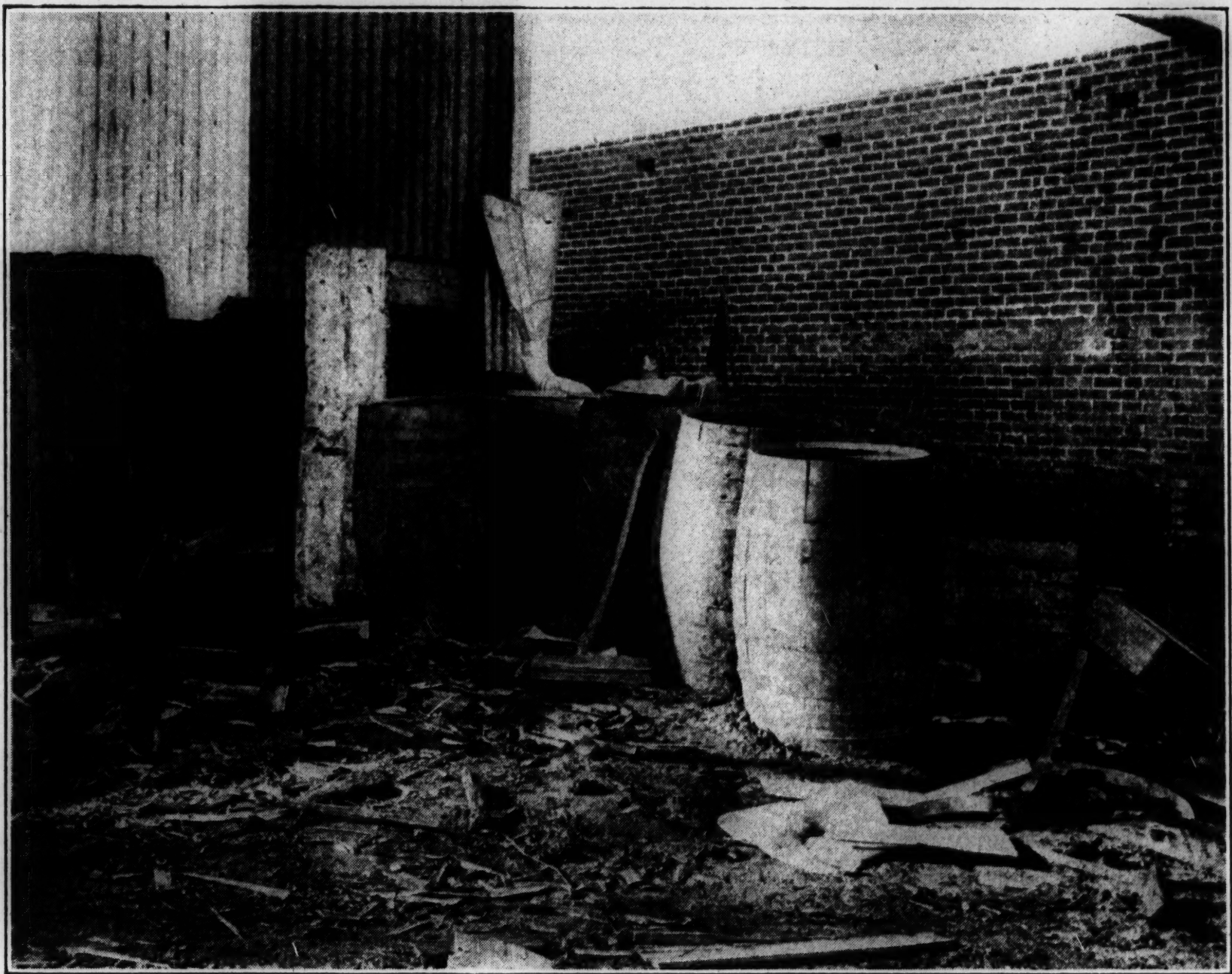


PLATE II. Standing water, if only a thimbleful, in barrels, cans, and tubs, will serve as a breeding place for mosquitoes.

Anopheles, but quite generally where the latter is found the former will also occur. The Culicine female will deposit her eggs even in the smallest receptacle containing water, such as tin cans, tubs, barrels and stagnant pools. (Plate II.) It should be noted here that running water is not a favorable breeding place for several very evident reasons. However, a running stream should be "edged up" so that no little coves are formed in which the water remains quiet. This applies also to gutters and irrigation ditches.

The most favorable places for Anopheles to breed are overflowed areas in which the water is shallow enough to allow grass and other low vegetation to be barely covered; such conditions are often produced by breaks in irrigation ditches (Plate III), water supply pipes and improperly channeled creeks. Marshy districts, in which the water is just



below the surface, are made dangerous through the hoof marks of cattle and horses. The writer has found that places, which the casual observer considers highly dangerous, are quite harmless, and the really bad places are often overlooked. Reservoirs, dredger ponds, and sluggish streams are often regarded with the keenest disfavor, but an examination indicates the entire absence of *wrigglers*. Of course a badly kept basin or reservoir may prove a menace due to the accumulated vegetation along the edges and the shallow condition of the water. A clean pond with sharp, deeply cut banks needs not be a menace as a mosquito breeder.

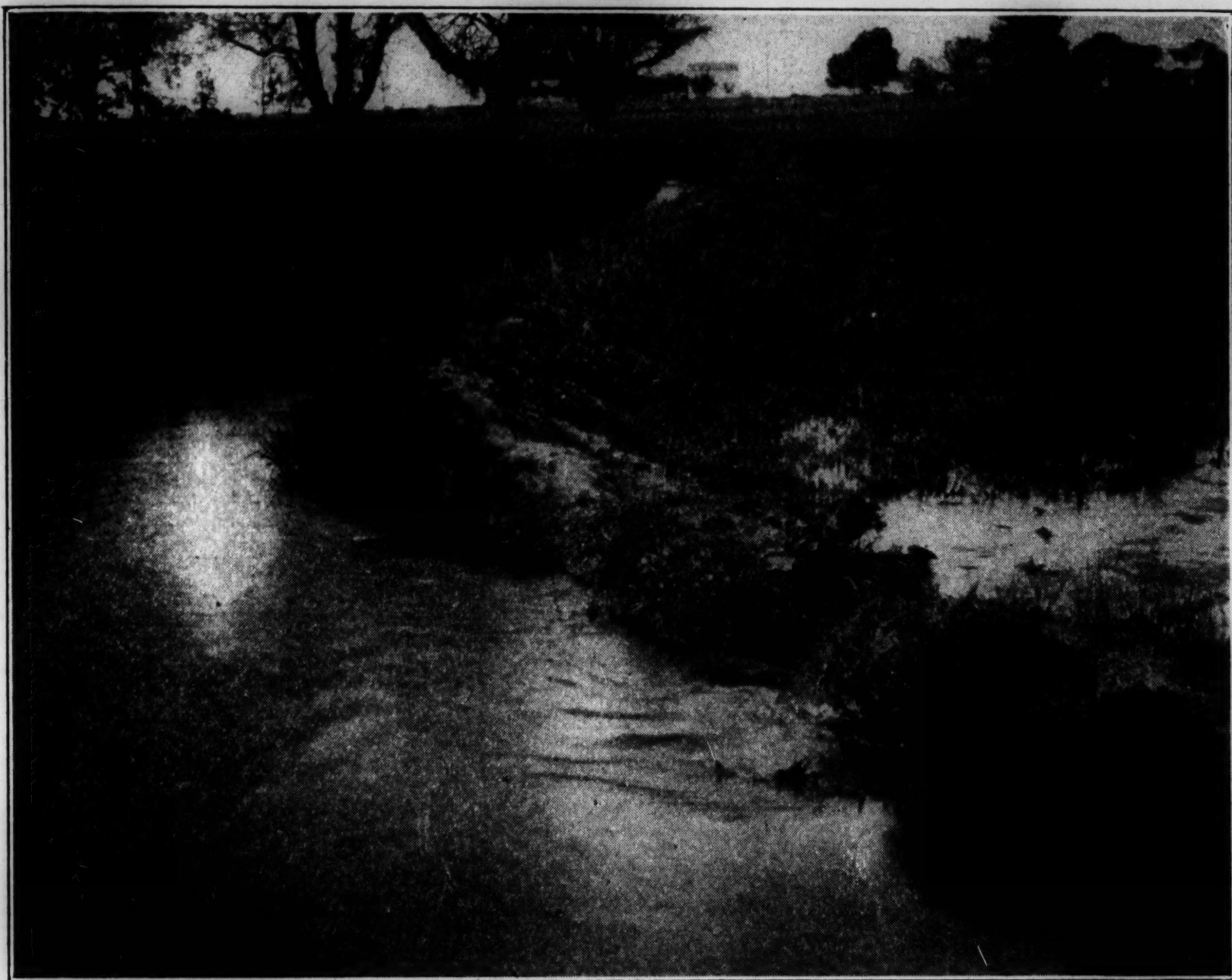


PLATE III. This break in the ditch caused several acres of good *Anopheles* swamp to be formed. The swiftly running water in the ditch can not harbor wrigglers. It took about ten minutes to mend the break. The overflow water had to be kept oiled until it evaporated.

A receding stream often leaves shallow ponds along its banks. These very often become the most suitable places for an abundance of these insects, especially *Anopheles*. The construction of railroads and highways frequently obstructs natural drainage causing stagnation of the water.

#### SALT MARSHES.

The *Anopheles* does not breed in salt or brackish water as far as we know, but there are several species of *Culicine* mosquitoes that are typically salt marsh breeders. The writer has been called on to locate the source of these pests, under San Francisco Bay conditions, where it seemed as though the entire marsh for miles might be equally good as a breeding place; this did not prove true, for only a comparatively few acres of fairly well protected marsh was found to be the source. Sev-



eral of these species are strong flyers and others are carried readily by the wind for a distance of several miles. Thus the source of the pest must often be sought by studying the prevailing wind and the species concerned. The *Anopheles* is not a strong flyer, and seeks shelter during a wind; therefore, the source of this species is always near at hand and is not a salt marsh.

#### ESSENTIALS OF CONTROL.

The essentials of control are indicated very clearly by the study of the life history (development) and habits of the pest, and rest on the application of two general methods, namely, temporary and permanent control. Temporary control consists in oiling the breeding places or adding a poison to the water such as nicotine, phinotas oil or salt (in the case of fresh water species). Manifestly this method requires constant repetition, but is extremely useful and really essential during the time that the permanent work is being advanced.

For the control of mosquitoes, especially the *Anopheles*, the best method by all odds is drainage, correction of irrigation methods, cutting deeper channels where the water spreads, etc. Thirty minutes' labor in cutting a ditch deeper, or digging a new one for a short distance, has very often absolutely eliminated a nuisance that has bred malaria mosquitoes season after season. It is highly important that control efforts should be systematic and thorough. Haphazard, slipshod work only results in dissatisfaction and new crops of mosquitoes.

#### OILING METHODS.

*Kind of Oil.*—The reason for oiling mosquito breeding ponds has already been explained. The most desirable oil for the purpose is one that will spread most readily without breaking up into patches and that will remain longest on the water in an effective condition. Crude oil, it will be seen, breaks up in patches between which the water is not affected so that *wrigglers* have been found by the writer developing in such places where this oil has been even liberally used. Crude oil also can not be used as such in ordinary spray pumps. Therefore it is evident that this material is not to be recommended for mosquito control. Its lasting qualities are very good, however. Kerosene spreads most satisfactorily and does its work quickly, but evaporates in a comparatively short time, thus requiring frequent repetition. A combination can very well be made of the two which will bring about more nearly the desired results. Our best results have been obtained with a mixture of equal parts of crude oil (No. 2 skid has been used mostly) and kerosene, though the proportion may perhaps safely range to three parts of the former to one of the latter. We have also used successfully a treated stove oil of about 32 gravity.

*How applied.*—Simply pouring on the oil with a dipper is wasteful and requires some little time if all the smaller adjacent pools of water to a given central area are to be treated. Experience has taught that the small, apparently insignificant pools of water are in reality the greatest menaces and are commonly overlooked. The use of a knapsack spray pump of five-gallon capacity is highly recommended. This can be strapped on the back and will provide enough oil for three or four hours of ordinary oiling on foot. Where it is out of the question



to use a horse and cart to carry the oil the field man can save himself many steps and some embarrassment if he will make it a habit to carry a small quantity of oil with him at all times in a pint or quart tin to which is attached a rubber bulb and a spray spout.

*When applied and how often.*—Oil should be applied whenever and wherever the *wrigglers* or tumblers are found even though permanent correction is planned. This will prevent them from being washed out into some other situation where they would be liable to complete their transformation. A teaspoonful of oil, poured on the water in a well, will not greatly affect the water for drinking purposes and will kill developing mosquito *wrigglers*. The frequency with which oil must be applied depends on the rate of development of the *wrigglers* and the evaporation of the oil,—both conditions dependent on the temperature. Therefore, more frequent applications are necessary during midsummer, when with the oil mentioned above the spraying should be repeated every two weeks, and with heavier oil and cooler climate (San Francisco Bay region) probably every four weeks. If it requires only ten days for some mosquitoes to pass through their entire transformation, one might think that applications of oil every two weeks would not be often enough but it must be remembered that the oil kills all *wrigglers* and tumblers at the time of contact and the coat remains on the water for four or five days, often longer, during which time any adult mosquito, intending to lay eggs, is killed on coming in contact with the oil. But after the oil has evaporated quite largely the breeding may begin again, but the next application of oil will catch the oncoming brood before the ten days necessary for complete development have expired.

#### TOBACCO DECOCTIONS.

The writer has thoroughly tested the efficiency of tobacco decoction, both in the laboratory and in the field, and has found it very effective, but the expense is prohibitive when used on a large scale. "Sulphate of Nicotine," made by the Kentucky Tobacco Product Company, was found to effectively destroy all *wrigglers* and tumblers when used in the ratio of 1 part to 750 parts of water. Greater dilution proved uncertain for the pupæ, but 1 to 1,000 is still effective for the larvæ. In field work this material was used for smaller pools and experimentally on a good sized quarry hole pond effectively, but not within financial limits. Ordinary "Black Leaf" tobacco decoction can not be used effectively in a greater dilution than 1 part to 20 of water. It must be remembered in all cases that a material in weaker strengths would be just as useful and less expensive if it killed the insect, even after a day or two, and this factor was borne in mind during the progress of experimentation.

#### PERMANENT CORRECTIONS.

If a useless pond of water can be drained easily, which is often the case, it is a foolish waste of time, energy, and money to repeatedly oil it. Marshy land, otherwise useless for agricultural purposes, can in most cases be made useful and also free of mosquitoes by digging a ditch of necessary depth with connecting laterals. The dry summers of California favor permanent corrective work, because standing water drained off at the termination of the rains in spring will remain dry for the rest of the summer. The Southern Pacific Company responded readily



to requests made for the correction of drainage along their right of way in lower Placer County, deeming it wiser to expend a larger sum for this permanent work than to apply oil, although this was done in some places. The writer mentions the fact because the wisdom of this procedure is recognized by these large corporations.

#### IRRIGATION WATER.

One of the greatest factors in the development of this State is irrigation, but many of our farmers pay little heed to the proper use of this blessing; water is wasted, ditches become clogged with weeds, and mosquito breeding ponds are created which are usually favorable for the dread *Anopheles*. In irrigating, the water should not be allowed to remain in pools for long periods, say not over several days. Water which had stood over ten days would be dangerous. The use of metal, cement or tile irrigation ditches, which will prevent lateral flow except where wanted, will help greatly in lessening the vast numbers of mosquitoes now produced in poorly kept ditches.

#### SALT MARSH AREAS.

Although the *Anopheles* mosquito does not breed in salt or brackish water some of the most formidable "biters" develop there, and, moreover, these mosquitoes may be carried by the winds for several miles from their breeding grounds and make life miserable for people living in communities unfortunate enough to be in the wake of the invading horde. But this can be corrected for it is found that not all portions of a marsh are a menace. For example, the writer examined several miles of such marsh land to locate the source of the pest and discovered that the breeding ground was restricted to a comparatively protected area of only a few acres. The recommendation was to run main channels from the open water to the dry land to a depth of three or four feet, connecting these main ditches with short laterals, in order that the tide waters might sweep clear in. Proper dyking is often essential.

#### RIVER TOWNS AND MALARIA.

As long as a river is high there will be little or no opportunity for mosquitoes to breed along its banks, but later in the summer, during June and July, many pools are left behind by the receding water. The stagnant water becomes green with algæ and soon *Anopheles* are breeding in abundance. The same condition also prevails along the smaller streams. On a recent trip up a small creek many of the mosquito wrigglers were found developing in pools covered with green scum, and along the edges where the current was very sluggish. In both cases the situation is a controllable one as has been demonstrated. The pools along the banks of the receding river can be drained off, in nearly all cases, or can be thoroughly oiled. Thus a river town need not necessarily be a malarial town. And again the banks of a creek can be kept clean at a small cost and this need only be done for a distance of about 300 yards on either side of the community; in most cases a hundred yards less will serve very well because the *Anopheles* mosquitoes are not strong flyers, being bred as a rule very near the place where they are found.



#### PRECAUTIONS.

Many cases of malaria could have been averted by the proper use of screens and mosquito netting. Far too little attention has been paid to the proper screening of sleeping apartments. Keep the mosquitoes from biting you and you need not contract malaria. Boldness in the face of danger is not valor. Time occupied in killing mosquitoes that may have gotten inside despite the screens is time well spent. Furthermore, it is wise to screen off malaria cases so that the mosquitoes do not become infected. A sort of night quarantine should be established. Finally, individuals necessarily exposed to mosquitoes will find that oil of citronella serves very well as a repellant. The oil, which is not dangerous, should be rubbed on to the face and hands.

#### SUMMER RESORTS.

An ideal summer resort is one in which mosquitoes do not take a prominent part. The *Anopheles* may not often have to be contended with, but the *Culicine* species are found more or less abundantly unless measures are taken to control them, and some of our summer resorts are far from ideal in this respect. The ease with which the pests can be controlled and the advertisement that a mosquito free resort deservedly secures should set managers working in this direction.

#### HOW TO INAUGURATE A CAMPAIGN.

Whether it is a community or a rural district some one must take the initiative, and sometimes several individuals get the vision of a mosquitoless summer at the same time. A letter is then written to the State University, Department of Entomology, or to the State Board of Health for advice and a response follows in due time. An evening lecture is arranged on the subject of "Mosquitoes,—their habits, relation to disease and control." A local committee in the mean time looks after the proper advertising so that a representative audience is present when organization is effected for active campaigning. After the lecture, during the same evening perhaps, a permanent organization is effected, or the responsibility of the work may be undertaken by an organization already in existence. It is absolutely essential that a committee at least be responsible as a medium between the citizens and the persons doing the actual control work.

The cost of an effective campaign is thought by some to be quite forbidding, but experience under conditions often apparently hopeless has shown that everything can be done within reasonable limits. Several areas, including both community and rural conditions, ranging from five to eight square miles of territory, have been handled during the present summer at a cost of from \$900 to \$1,400, and much permanent corrective work has been done so that the cost for a second season will be considerably less.

If a campaign is to be successful some one must be responsible for the work in the field, and the salary for this individual represents the largest item of expense except where an unusual amount of permanent work is undertaken. It is of great value to the community that field work be done by one who has had some training in medical entomology. The field agent, as this individual has been called, is directly responsi-



ble to the writer when campaigns are begun and planned under his direction. Frequent visits are made by the latter to the various fields when suggestions and recommendations are made for future operations and criticism passed on the work already accomplished. Systematic, thorough work is essential and a plan of operation is equally necessary. The coöperation of county and local boards of health is generally readily secured, and to facilitate the progress of the crusade the field agent is made a County Sanitary Inspector and the writer Deputy County Health Officer. Thus the work is placed on a legal as well as a dignified footing.

#### HOW TO RAISE MONEY FOR A CAMPAIGN.

Before a campaign is fairly begun enough money should be guaranteed to finance it properly. The field agent's salary must be paid, traveling expenses are to be met, oil, spray pump and other minor apparatus must be purchased. In order to do this one community used three ways, First, membership fees to the Anti-mosquito League, second, a tag day (netting over \$400), and third, dredger companies guaranteeing \$25 for each dredger operated in the district. Another community raised the necessary amount through direct subscription. A rural district raised the sum needed by a small monthly subscription ranging from fifty cents upward.

#### LEGISLATION DESIRABLE.

Since all the citizens of a given area are equally benefited by such a campaign and not all contribute according to their means, there is of course some injustice to those who carry the burden. Public-spirited citizens will always have to take the initiative and bear the larger burden of progress, especially sanitary progress. But a fair property assessment based on sanitary districts would be no hardship on any one and the work of control would go on unhampered. A special county tax for such a purpose has been suggested; this may have its advantages but one end of a county may not be in need of this kind of work and therefore would have no returns for the taxes. The sanitary district plan seems better.

A prominent business man, a resident in one of the campaigning districts, said recently that in the face of present encouraging results he would rather see California bond itself for an appropriation to fight the mosquito than even for good roads, a matter in which he was also vitally interested. The little State of New Jersey appropriated several hundred thousand dollars for this purpose, much of which amount went toward experimentation. In California the experimental stage is long passed and the amount already expended goes to show that \$200,000 wisely spent would be of inestimable benefit to the Sacramento and San Joaquin valleys. It is quite probable that such a sum could be made to produce the largest amount of good, if it were distributed with the requirement that each district undertaking a mosquito campaign could secure half the amount necessary from the fund, while the other half must be raised in some way locally. After careful studying the situation in this State, the writer is convinced that a legislative act of this kind would give a wonderful impetus to colonization.



#### THE EDUCATIONAL FACTOR.

Giving the answer to the questions, Why and How, is the part the educator must play in the science of sanitation. If once the people of a town or village catch the vision of better things, and are taught how to realize these things, the problem is largely solved, for there will surely be some who will put the matter to a test.

To help answer these questions at least one lecture, well illustrated by means of charts and other material, should be given at the beginning of each campaign. This we generally follow up with brief newspaper articles, for the press is one of the greatest educational factors in America. Show window displays are effective in which the properly labeled living insects are exhibited as they pass through their various stages of development. Also the action of the oil can be thus nicely illustrated. The interest that this sort of display arouses is immense and few merchants hesitate to allow at least part of their windows to be so used.

A laboratory may or may not be established in which the more scientific phases of the subject are illustrated by means of the microscope and other apparatus. The writer has found such laboratories very valuable since it gives the field agent an added impetus and adds to his efficiency in the field. Here the more detailed habits of the individual insect can be observed.

One of the most potent factors in our work is that accomplished with and through the school children. The school children are visited in the class room and the story of the mosquito wriggler is told; how the mosquito carries disease and how to prevent it. Demonstrations with the living wrigglers can easily be made. Interesting essays are then written by the children and the best may be published in the local paper, all of which stimulates interest and gives the child a grasp on practical subjects. The lessons in practical hygiene learned at this time will be applied at once, and a generation of citizens is reared with some knowledge of sanitation.

The use of a mosquito pin or button has resulted in much good. On answering some simple question on mosquitoes correctly, or after putting oil on a little pool, the child receives such a pin from the Inspector as a reward of merit.

#### WORK INSIDE THE TOWN OR VILLAGE.

The best housekeeper sees that her house is cleaned thoroughly once or twice a year, and she is proud to tell her neighbors that the work is in progress or has been completed. Yet the town or village goes without a housecleaning, perhaps for years, and if a clean-up day is mentioned the citizens hold up their hands in horror, asserting that the town will get a bad name if others find that a clean-up day is contemplated. Yet just this kind of work is a great factor in controlling mosquitoes, flies and other noxious insects. A careful house-to-house inspection by the Sanitary Inspector is a big task but worth the time and energy. Here this officer comes in contact with the individual and does personal work. The capacity of an advisor is most satisfactory but occasionally the law must be enforced. No man has the right to use his property in such a way that it is a menace to his neighbor's health, no matter what his position is socially or politically. If our communities would inaugurate a clean-up day to occur every year at a stated time, there would surely be a noticeable reduction in disease.



## HOW THE STATE HYGIENIC LABORATORY PROTECTS CALIFORNIANS.

By WILBUR A. SAWYER, Director State Hygienic Laboratory.

While almost every one has a rather definite and fairly correct idea of the function of the State Food and Drug Laboratory in detecting injurious and poisonous substances in foods and medicines, very few have a clear idea of how the Hygienic Laboratory helps to fight poisons—those most destructive and wide spread poisons produced by the living germs of disease. These invisible poison producing enemies are constantly being carried by innocent persons from unrecognized cases of contagious diseases to those who soon are compelled to give up health and often life.

It is the function of the State Hygienic Laboratory to offer physicians and citizens every facility for early recognition of these cases of communicable disease. Such recognition aids the patient by enabling the doctor to promptly begin the specific treatment of the disease, and aids the public by enabling the health officer to institute necessary precautions against other persons being exposed. The laboratory can not accomplish either of these things except through the efficient services of health officers and other physicians, who investigate the local conditions and send suspected material to the laboratory for examination. These busy men carry heavy responsibilities and have meager time for laboratory work, even if they are able to equip a complete bacteriological laboratory for their private practices. It is proper that the State should examine all materials which may lead to information of importance to the public health.

The methods and scope of the work in the State Hygienic Laboratory, as given in the following outline, are well known to the physicians of the State, but may prove of interest to others.

### (a) ORGANIZATION OF THE LABORATORY.

The central laboratory, through the courtesy of the University of California, is located on the campus at Berkeley, and has as its supervising director a member of the University faculty. Beginning with July, 1910, this central laboratory will be supplemented by the establishment of a system of substations. Owing to the great size of California, and especially its great length of nearly 800 miles as the bird flies, a central point like Berkeley is over 500 miles from the farthest corner of the State. Such great distances make it out of the question for some communities to send specimens to the laboratory and to receive the telegraphed answer in time to get the full benefit of the results. To bring the laboratory nearer to the physicians of the south a branch laboratory is in operation in Los Angeles, and for the benefit of the San Joaquin Valley another is being established in Fresno. Physicians are expected to send their cultures to the nearest laboratory in order that the least time may be taken up by transportation. These branches are an integral part of the central laboratory and will greatly enlarge its field of usefulness.

The central laboratory does the routine work for northern California and the coast counties north of Tehachapi, provides culture media and supplies for the two substations, and carries on all special investigations ordered by the Board.



The branch laboratory at Los Angeles does the routine work for the following counties: Imperial, San Diego, Orange, Riverside, San Bernardino, Los Angeles, Ventura, Santa Barbara.

The branch laboratory at Fresno does the routine work for the following counties: Kern, Kings, Tulare, Fresno, Madera, Merced, Mariposa.

(b) ROUTINE EXAMINATIONS.

By routine examinations is meant the usual examinations of sputum for tubercle bacilli; throat cultures for diphtheria bacilli; blood specimens for malaria parasites and for typhoid bacilli; and similar materials, information concerning which is of public importance.

DIPHTHERIA.

Diphtheria is a disease in which throat cultures furnish the only reliable method of diagnosis. It is a readily transmissible disease which frequently breaks out in epidemics of considerable importance. The laboratory furnishes outfits which can legally be sent through the mails. In the outfit is a sterile cotton swab which the physician applies to the spots in the patient's throat. The next step is to plant the "germs" from the throat on the food-substance contained in a stoppered glass tube, by rubbing the infected swab gently over its surface. The mail service hurries the culture to the laboratory, where it is incubated at body temperature overnight. In the morning the bacteriologist finds the surface of the culture to be covered with small visible spots or colonies, each containing large numbers of rapidly multiplying bacteria. A few of these are rubbed off, smeared on glass, stained with a combination of dyes, and then examined under a high-power microscope. Bacteria of many sizes and shapes are scattered through the field and it is sometimes no easy task to find among them the diphtheria "germs." As soon as the search is completed, the results can be flashed over the wires to the waiting physician. If the case is found to be diphtheria, the patient can be removed from danger by the use of antitoxin, and the members of the household, who have been exposed, can be prevented from developing the disease from the germs already lodged in their throats by small doses of the same medicine. The importance of rigidly enforcing quarantine in these cases is apparent. Repeated cultures during convalescence show when the germs have disappeared. When the bacilli are gone quarantine is no longer necessary. The State Board of Health therefore requires the quarantine for diphtheria to be enforced until negative cultures prove the absence of any further diphtheria bacilli in the nose and throat of the patient.

Frequently epidemics of diphtheria break out from some unknown source. These outbreaks are usually started by so-called "carriers," people who suffer no ill effects from the diphtheria bacilli, but who carry these "germs" in their throats. Many of them have previously had diphtheria, but have not become entirely free from its bacilli. Others have temporarily taken the germs into their air passages from sick persons, but owing to great natural resistance to the disease, they have prevented the organisms from making them ill. Such persons can only be discovered by the systematic taking of cultures. It is far better to find the "carriers" among the school children and to isolate them, than to close schools, making the street and the playgrounds distributing centers for the disease. During the year just ended, the State Labo-



ratory examined in Berkeley 790 cultures for cases suspected of having diphtheria or cases applying for release from quarantine. Of these cultures, 627 were negative and 163 contained the diphtheria bacilli.

#### MALARIA.

A disease of great economic importance in California is malaria. Where the disease is prevalent, employees are apt to be driven away or rendered less efficient. Our irrigation ditches and rivers, unless carefully looked after, furnish breeding places about their borders for the mosquitoes which carry malaria from man to man. The first step in rousing a community to the importance of the eradication of this scourge by combating the mosquito, is to prove that the debility and anæmia from which many of them suffer, as well as the occasional attacks of "chills and fever," are due to malaria. The best way of proving this is through the help of the laboratory. A drop of blood taken by a physician from a needle-prick in the lobe of the ear and smeared on the glass slides furnished by the State, will provide sufficient material for the laboratory examination. At the laboratory the dried blood-smears are stained until the parasites can be readily seen in the red blood corpuscles. Microscopic search will reveal these low forms of animal life, if they are present in any considerable number in the peripheral circulation. The importance of the diagnosis to the individual is great, for malaria has a definite treatment different from that of the diseases with which it is commonly confused, such as typhoid, anæmia from other causes, and dyspepsia. The physicians of the State so far have made little use of the laboratory in examinations for malaria, probably not being fully aware of what the State is willing to do in this line. Only twenty-eight specimens were received during the year just ended.

#### TUBERCULOSIS.

Even the most healthful of our communities suffers from the most prevalent of scourges—tuberculosis. The examination of the sputum of those who are suspected of having their lungs involved is carried on at the laboratory and its branches. Specimens of sputum can be sent by mail in the containers which the laboratory furnishes to physicians. Particles of the material are thinly spread on glass and are colored so that tubercle bacilli appear bright red while other germs and structures stain blue. If the characteristic rod-like organisms are found by microscopic search, the patient can be definitely told what he must do to control the disease. Thus much valuable time is saved which in many cases would be lost if it were not possible in this way to tell beginning tuberculosis from other lung and bronchial affections. Of course the examination of the lungs by the physician is extremely valuable and may furnish a reliable diagnosis, even when the particular specimen of sputum examined at the laboratory does not happen to contain the germs. Many persons when asked for sputum send material from the nose or mouth instead of that from the lungs. This shows the necessity for care on the part of the patient and explains an occasional negative result in the early stages of pulmonary consumption. Beside warning the patient to treat his disease in time, a positive sputum examination demonstrates to him the necessity of destroying the material which he expels from his mouth. A conscientious and well-informed consumptive is of little danger to those around him. The unrecognized case is



a menace. By repeatedly examining the sputa of suspected individuals, the laboratory plays an important part in the present widespread campaign against a most destructive disease. During the year ending July 1, 1910, there were examined in the main laboratory 258 specimens of sputum. Of these 67 contained tubercle bacilli and 191 did not.

#### TYPHOID FEVER.

At this time of the year, the latter part of summer, typhoid reaps a harvest in those California communities which neglect their sanitary problems. One unrecognized or improperly cared-for case of typhoid entering such a community becomes a source of greatest danger. Such a sick person may be the source of germs which will infect a water supply or which will multiply in the cans of a careless milk company. As a result sickness and death may be scattered through a city. After the original source of infection has been removed, the disease is apt to be redistributed in the community through the medium of the house-fly until the penalty for the original neglect has been more than fully paid. To help discover the wandering case of mild typhoid fever and the recovered typhoid carrier, as well as the acutely sick, becomes an urgent need. If such cases are properly cared for and are kept from occupations involving the handling of food, they lose most of their danger. The laboratory assists in discovering them by making a definite diagnosis by means of the Widal test or by isolating the typhoid germs from a mixture of ox-bile and the blood of the patient. The Widal test is made with a drop of blood taken from the patient and dried on the aluminum foil of our mailing outfit. The bacteriologist weighs out a small definite quantity of the dry blood and mixes it with distilled water. To this he adds live typhoid germs which are kept on hand in the laboratory. If the patient is well started in the course of an attack of typhoid fever his blood will have a striking effect on the germs in the mixture. Through the microscope they will soon be seen to lose their activity and to gather in clumps. If the patient does not have typhoid and has not recently had it, the germs will not be affected by the blood and will continue to swim about actively. Where it seems advisable the same test is applied with para-typhoid germs, a strain of bacteria almost identical with typhoid bacilli. They produce diseases indistinguishable from ordinary typhoid fever. During the past year 212 samples of blood have been examined for the Widal reaction. Sixty-four of these gave positive reactions indicating that the blood came from cases of typhoid.

The diagnosing from clinical symptoms and blood examinations of the cases of typhoid in a town, is the first step in searching out the source of infection. When this has been accomplished a study of the possible exposures to typhoid, which are common to the greatest numbers of the victims, will usually cast suspicion on some one method of propagation of the disease. Raw vegetables which have been fertilized by untreated sewage, or polluted water or milk, or the ever present house-fly are often to blame. If the water used in the community falls under suspicion, the laboratory again enters the arena. Specimens of water are collected in sterile bottles with special precautions and are sent, packed in ice, to the laboratory. If bacteria characteristic of sewage pollution are found to be prevalent, the supply is declared unfit for



human consumption. During the year samples from 61 water supplies have been searched for the kinds of bacteria common in the excreta of man and animals. If these occur in large numbers, the water is decidedly unsafe. If the sewage of healthy human beings enters the water supply, no distinct harm may be noticed for a while, but sooner or later water-borne diseases are sure to appear among those producing the sewage and the district using the polluted water is suddenly swept by a wave of typhoid or some other water-borne disease.

(c) SPECIAL EXAMINATIONS.

AMOEBIIC DYSENTERY.

Numerous other investigations are undertaken at the laboratory as they assume importance. The laboratory will examine human stools for the parasites of amœbic dysentery, a disease which should be carefully watched in this State and kept from spreading.

RARE PARASITES.

Frequently physicians find rare parasites in the blood or excreta of their patients. The laboratory will undertake to determine the nature of such parasites whenever they are properly prepared and sent in. The director of the laboratory has often been indebted to the scientists in the various departments of the State University, and to others for aid in such work.

RABIES.

Last fall a misfortune fell upon California in the first appearance in the State of hydrophobia or rabies. This disease is spread almost entirely by the introduction of infectious saliva through the skin by means of the bites of rabid dogs. Although the disease is almost invariably fatal after symptoms have once begun, it may be prevented by the Pasteur treatment during the long incubation period of the disease. It is very important that human beings bitten by dogs, should know whether the animal is rabid or not. This they can find out by sending the head of the animal, packed in ice, to the State Hygienic Laboratory. If possible, the animal should not be killed, but should be cared for in a pen until recovery or death has occurred. Recovery shows that the animal probably did not have rabies. At the laboratory the large cells of the gray matter of the animal's brain are searched for peculiar structures known as Negri bodies. When these are present they indicate that the animal had hydrophobia. The results are telegraphed to the health officer or physician, and if positive, they indicate the necessity of beginning Pasteur treatment and the muzzling or confining of the dogs of the community to prevent other persons being bitten. Since the beginning of last November the heads of 29 animals have been sent to the main laboratory for examination for rabies. A study of these specimens showed hydrophobia to have been present in 22 of the animals.

ANALYSES—WATER, MILK, OTHER MATERIALS.

Special examinations of water, to show sewage pollution, of milk, to demonstrate tubercle bacilli, of foods, to prove the presence of bacteria which produce ptomaines, and many other similar examinations which require special methods and much time, are carried out only upon instructions from the Secretary of the State Board.



(d) RESEARCH WORK.

Systematic research at the main laboratory ought to be carried on along lines bearing on public health. Many of the contagious diseases are far from being fully understood, and California should do her share toward devising methods of combating them. An efficient research department could not fail to increase the weapons which are directed against disease. For example, the disease called infantile paralysis is now prevalent in a few communities of our State and our lack of knowledge concerning its cause and method of transmission prevents intelligent efforts to stop its spread. A line of investigation which ought to be continued is the examination and exposure of fraudulent antiseptic substances and devices. This would prevent the public from wasting their money on the antiseptics which have little killing power for germs. To depend on inert substances for protection against contagion gives a false and dangerous sense of security. A systematic examination of common distributors of infection, such as public-drinking cups, contaminated food, and flies, would bring before the public the importance of eliminating these sources of danger.

Whatever is discovered and published by the Hygienic Laboratory immediately becomes the property of the whole country, and we Californians should make return for the information which other laboratories are constantly presenting to us.

(e) POLICY OF THE LABORATORY.

It is the purpose of the Board to examine all specimens and materials which have a bearing on the public health, that may be presented to it. However, many of our cities and several counties now have excellent laboratories in charge of competent bacteriologists and the Board does not wish to duplicate work or facilities. Therefore, materials from such cities and counties are received only at the request of these local laboratories or when accompanied by adequate reasons for sending them directly to the State Laboratory.

The State Board of Health is required by law "to examine into the causes of communicable diseases in man and domestic animals occurring or likely to occur in this State" and to "cause special investigation of the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health \* \* \*." The laboratories of the Board are necessarily of great value in carrying out these provisions, and the directors have consequently been instructed to reserve what time they can from the routine work in order to make progress on some of the many important unsolved problems which California health officers have to meet.

**EDITORIAL COMMENT.**

*Summer Resorts vs. Summer Risks.*— It is not a wise policy for Californians to live ten or eleven months of the year in a city where they have striven to surround themselves with every modern safeguard against disease, and then spend the remainder of the year in a summer resort where none of these safeguards exist. Many of the popular resorts of California have no adequate sewage disposal; no protection against flies; poor kitchen sanitation; no supervision of the health of employees (many of whom are themselves seeking health by obtaining



light employment in the mountains) ; questionable swimming baths and inefficient laundry of towels and suits ; milk from dairies that have never been inspected ; . . . ! This sounds biased and exaggerated. It is, however, simply a partial inventory of the opportunities we offer our disease enemies in many of our resorts. The hotel and camp managements will correct these defects as rapidly as their patrons demand it as a basis for selecting a place for their summer outing.

*The Shades of the Vigilantes.*—It is interesting to speculate on what would be the verdict of those men of metal of the vigilante days of California could they return to express their opinion of our present day juggling of the law. Or better, could the modern evasions of law and justice be staged in the settings of the pioneer days would the vigilantes have issued a call for organization after such decisions as this? A California city had passed a smoke ordinance after the combined efforts of its citizens and the press. The regulation seemed a good one and important to the health of the city. The inspectors collected their information with care. Among the prosecutions ordered, interest centered about several of the specially flagrant offenders. The cases came up for hearing: in the first case the facts were not contested. But the papers had been made out against the executive officer of the company,—a man known in the commercial and banking world as unquestionably identified with this company, and the judge asked the health board how they knew this man was the executive officer of the company charged with the violation. A prompt answer not being forthcoming the case was dismissed. In other proposed prosecutions it was pointed out that the citizens' ordinance permitted dense smoke a certain number of minutes per day from each smokestack. By erecting a series of stacks and adjusting themselves to the inconvenience of directing the smoke from one stack to another, companies were able to comply! with this fussy law of the people. In the meantime the citizens are divided in opinion. Some say, "What's the use?"; others, "The health board is inefficient"; while still others are stout-heartedly raising subscriptions to care for the tuberculous, and advising their neighbors to breathe pure air.

We have fortunately passed the day of the vigilantes. They were brave men who believed, as we do not, that "to do a great right" it was justifiable to "do a little wrong." And yet there is some temptation to say in the spirit which was Bassanio's

Backward, turn backward,  
Oh, time in your flight,  
And decide just one case  
With promptness and might.

*Public Health Work as a Labor of Love.*—The State Board of Health, in common with many local boards, is most fortunate in having drawn into its service for a time a number of capable, earnest, enthusiastic young pioneers. Unquestionably the coming year will show many far reaching results of their activities. The general public will reap the benefits of their labor, and the public will undoubtedly be appreciative, but will the public apply the trial-balance of commerce to see what these benefits have cost them? And whether the field has been made to yield all the profits it should? If this trial-balance is applied it will show that the work of the public health officer is essentially a labor of love, and—what is even more important to the public—it is a labor which, due to poor business methods, yields a very small percentage of its possible profits.



## THE CONSERVATION MOVEMENT.

### RECENT ADVANCES IN SANITARY ENGINEERING.

#### WATER STERILIZATION BY THE USE OF CHLORIDE OF LIME.

By N. D. BAKER, Engineer Inspector, State Board of Health.

Bleaching powder or the commercial "chloride of lime" has long been employed as a deodorizer and disinfectant, but it is only within the last year or two that it has come into use in the treatment of public water supplies on a large scale. Although of such recent origin, the process has already been adopted by many cities throughout the United States and Canada. It is one of the surest and cheapest ways of rendering safe for drinking purposes waters from slightly polluted sources.

It is not claimed for the bleaching powder process that it removes the organic matter present. It merely kills the "germs." The two fields open to this form of treatment are:

1. Treatment by disinfection alone of slightly polluted waters where the sewage matter is enough to be dangerous, but not enough to cause color or disagreeable odors; also sources that are subject to occasional pollution only.

2. Treatment of more seriously polluted waters by both filtration and disinfection.

Most of the sources in California where this treatment is applicable fall into the first named class. A number of our towns have surface sources that are never above suspicion and that are frequently subject to serious pollution. The fact that a water is clear and cool and not offensive to sight or taste does not necessarily mean that it is safe for drinking.

#### CHEMICAL REACTION.

In a paper read before the American Water Works Association in 1909, Dr. J. L. Leal explains the chemical action of the bleaching powder essentially as follows: Bleaching powder is unstable and when put into water breaks up into chloride of calcium and hypochlorite of calcium. The former is inert, and the latter reacts with the carbon dioxide in the water, forming carbonate of calcium and hypochlorous acid. In the presence of oxidizable matter the hypochlorous acid breaks up, giving off its oxygen, hydrochloric acid being left. This acid then unites with the carbonate, forming calcium chloride. The process is wholly an oxidizing one, the work of oxidization being done entirely by the oxygen set free from the hypochlorous acid in the presence of oxidizable matter.

Objection may be raised that the bleaching powder may be harmful when introduced. Such is not the case, for no free chlorine is released into the water and the only effect is a slight increase in the total hardness. This is so slight (only two or three parts per million) that delicate analyses could hardly detect it. Mr. Geo. E. Johnson states that a person drinking a gallon a day of the treated water would be seven thousand years getting as much free chlorine as is sometimes given without danger in a single medicinal dose.



#### APPLICATION AND COST OF APPARATUS.

It is true that the chemical is a very powerful disinfectant and it is therefore applied in very minute proportions and must not be used without intelligent supervision. Personal errors of attendants can best be eliminated by the use of well designed dosing apparatus, and such can be obtained from many of the chemical supply houses.

This apparatus consists of a system of solution tanks and various devices for regulating the flow. The cost of the plant need not be excessive. Mr. Charles Gilman Hyde, in making plans for Sacramento, estimated the cost of a plant to treat fifteen million gallons per day at about \$3,000, including buildings. At Nashville, Tennessee, dosing apparatus treating fifteen million gallons per day cost \$400. At Montreal, Canada, the plant of the Montreal Water and Power Company treats nineteen million gallons per day; the cost for buildings was \$688 and for apparatus, \$440. The total cost of the Montreal City plant, designed to treat forty million gallons daily, was \$5,770.

#### EFFICIENCY AND AMOUNT USED.

Professor Phelps of the Massachusetts Institute of Technology, found .25 to .40 parts per million available chlorine necessary to sterilize.

Professor Newlands of the Connecticut State Board of Health, used one part per million or about 25 pounds bleach per million gallons of water. This amount removed all *B. coli* and 99.5 per cent bacteria. In using .5 part per million or 12 pounds per million gallons, he got as good results (99.5 per cent removal). For general work he recommends 1.5 part per million, or 36 pounds of bleach per million gallons of water.

The Baltimore County Water and Electric Company of Avalon, Maryland, made experiments with chloride of lime in connection with filtration. They got good results with .25 to 1.5 parts per million of available chlorine.

Mr. A. E. Walden states that .10 grain per gallon or .5 part per million available chlorine gave good efficiency. This is 12½ pounds per million gallons of water.

At the Lawrence Experiment Station in Massachusetts, Clark and Gage found that 1 part per million gave as good bacterial results as the best slow sand filters. They advise 15 pounds to 25 pounds per million gallons water or .6 to 1 part per million available chlorine.

Experiments recently made by the Department of Sanitation of the People's Water Company of Oakland, California, show good bacterial efficiency from the use of .37 part per million available chlorine. The experiments were carried on in the Oakland laboratory by Mr. B. G. Philbrick, under the direction of Mr. Chas. Gilman Hyde, director of sanitation for the company.

Experiments on Mississippi River water at Quincy, Illinois, were made by Mr. W. R. Gelston, superintendent of the Citizens' Water Company of Quincy. He found good efficiency in bacterial removal with 1 part per million available chlorine.

In many of the experiments especial attention was paid to the effect of the treatment on the intestinal organism *B. coli*. It may be safely assumed that quantities that will eliminate *B. coli* will be an effectual guard against water-carried intestinal diseases. The general consensus



of opinion among the experimenters is that, in ordinary cases, 1 part per million of available chlorine will be effectual in removing bacteria. This is about 25 pounds per million gallons of water treated.

#### PLANTS IN ACTUAL OPERATION.

Mr. Geo. A. Johnson of the Jersey City Water Supply Company at Boonton, New Jersey, used at first 36 pounds of bleach per million gallons of water or 1.4 part per million of available chlorine. He later found he could reduce this amount to 5 pounds per million gallons or .2 part per million available chlorine and still get good results. This was one of the first plants put into operation.

At Montreal, Canada, the Montreal Water and Power Company use 145 pounds per day for nineteen million U. S. gallons. This amount is said to give good results. The plant was put in operation in January, 1910. The Montreal city plant was put into operation in February, 1910, and treats forty million Imperial gallons, or about fifty million U. S. gallons of St. Lawrence River water per day.

At Harrisburg, Pennsylvania, hypochlorite of lime is employed in connection with rapid sand filtration. The operation began in September, 1909. They use .3 part per million available chlorine and it removes all *B. coli* and gives good results on the removal of total bacteria.

The plant in Minneapolis, Minnesota, was designed by Mr. F. H. Bass of the University of Minnesota and Mr. J. A. Jensen, engineer of the Minneapolis Water Department. It was put into operation February, 1910, and treats twenty million gallons of water per day, using from 1.3 to 2.6 parts per million available chlorine.

#### COST OF TREATMENT.

The cost of treatment may be divided into three parts, as follows:

1. *Cost for chemicals alone.* In Massachusetts a chemical bleach can be purchased in car load lots for \$25 per ton or 11¼ cent per pound. Assuming available chlorine of 33 per cent (it frequently runs as high as 40 per cent) we use 25 pounds of bleach to every million gallons of water to give one part per million of available chlorine. At this rate the cost for the chemical is about 30 cents per million gallons. With a view to using the treatment for some of the Oakland supplies, Mr. Chas. G. Hyde of the People's Water Company, has found that he can get bleach in car load lots at about \$24 per ton, f.o.b. Midland, Michigan, and the additional cost for freight would be less than 75 cents per hundred pounds. This would bring the cost in Oakland to about 2 cents per pound in car load lots.

2. *Cost of attendance.* In many cases, especially in small plants, this item need not be considered. The same force that is necessary at the pumping station or the filter plant will be sufficient to look after the application of the bleach. In large plants it may be necessary to have special help for this purpose, but the total cost will be very small in proportion to the water treated.

3. *Interest and depreciation on the investment.* In his estimates for the Sacramento plant, Mr. Hyde placed the additional cost of sterilization at \$2.50 for chemicals to which is added the interest on the \$3,000



investment. The total cost per year for treating the twelve million gallons per day would be a little over \$1,000, of which only \$150 is represented as interest on the investment.

#### WHAT CAN BE EXPECTED OF STERILIZATION.

As has been stated before, we can not expect sterilization alone to take out the excess of organic matter from a grossly polluted water. It is not a universal panacea. The aim of the bleaching powder process is to "kill the germs" and render *safe* water which is already acceptable from the standpoint of color, taste and other considerations.

The estimated average loss to the community of one death from typhoid fever is \$10,000. Is it not a good business proposition to make our water supply safe by expending one tenth of this amount each year?

#### REFERENCES.

- Chemical Reaction. Engineering Record, vol. 59, page 771.  
Application. Engineering Record, vol. 59, page 771; Engineering Record, vol. 58, page 663.  
Paper by A. E. Walden. Engineering Record, vol. 59, page 773.  
Experiments at Lawrence, Mass. Engineering Record, vol. 60, page 333.  
Experiments at Massachusetts Institute of Technology, Engineering Record, vol. 61, page 646.  
Montreal Plant. Engineering Record, vol. 61, page 244; Engineering News, vol. 63, page 393.  
Connecticut Board of Health Experiments. Engineering Record, vol. 61, page 193; Engineering News, vol. 63, page 393.  
Experiments at Avalon, Md. Engineering Record, vol. 61, page 621.

In the *Engineering News* of April 7, 1910, there are several good articles on the disinfection of water with hypochlorite of lime as follows:

Quincy, Illinois, Experiments.  
Minneapolis Plant, page 391.  
Nashville, Tennessee, Plant, page 390.  
Harrisburg, Pennsylvania, Plant.  
Montreal, Canada, Plant.  
Editorials.

### NEW MEASURES IN PUBLIC HEALTH ADMINISTRATION.

#### A COMPREHENSIVE ORDINANCE FOR FLY CONTROL.

*The Champion* of Chino, California, with a public spirit which is highly commendable, devotes nearly two columns to the consideration of an ordinance aimed against the fly evil, and a large amount of tabloid information concerning these pests. This ordinance was framed by the Indiana State Board of Health, and sent to the mayors in all the cities of that State, and the Kansas State Board of Health has copied and distributed it freely throughout their State. California cities and towns can not afford to be behind in this great movement, and a copy of the ordinance is here given with the hope that it will be generally adopted by our people:

WHEREAS, It is commonly known that flies are very dangerous carriers of filth, filth poisons, and disease germs, that they are born in filth, and are a constant threat against the health, happiness, and prosperity of the people; therefore,

SECTION 1. *Be it ordained by the mayor and council of the city of*——, that it shall be unlawful for any person, firm or corporation to suffer or permit or have upon their premises, whether owned or leased by them, any one or more of the following unsanitary fly-producing, disease-causing conditions, to wit: (1) Animal manure in any quantity which is not securely protected from flies; (2) privies, vaults, cesspools, pits or like places, which are not securely protected from flies;



(3) garbage in any quantity which is not securely protected from flies; (4) trash, litter, rags or anything whatsoever in which flies may breed or multiply.

SEC. 2. It shall be the duty of the chief of police or city marshal and health officers, upon learning in any way whatsoever of the existence of one or more of the unlawful conditions described in section 1 of this ordinance, to notify the offender in writing, upon order blanks provided by the city clerk, to remove or abate said unlawful conditions, stating the shortest reasonable time for such removal or abatement. In the event of the refusal or neglect on the part of the notified offender to obey such order, the chief of police or health officer shall inform the street commissioner, upon a blank provided by the city clerk, and it shall then be the duty of said street commissioner, and he shall have power and authority, to remove and abate the reported unlawful conditions; and he shall keep an accurate account of the cost and expenses thereof, which shall be paid from the city treasury upon the sworn vouchers of the street commissioner, and said cost and expenses shall be a lien upon the property and shall be collected by law as taxes are collected and duly paid into the city treasury.

SEC. 3. Any person, firm, or corporation found guilty of having created or suffered to exist on premises either owned or leased by them any one or more of the unlawful conditions named in section 1 of this ordinance shall be punished by a fine of not less than five nor more than fifty dollars.

SEC. 4. All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed; and whereas an emergency exists, this ordinance shall be in effect upon and immediately after its passage.

### **THE CALIFORNIA PUBLIC HEALTH LEAGUE.**

The minutes of the initial conference of the associations constituting this League were reported in the May number of this Bulletin.

#### **STANDING COMMITTEES OF THE LEAGUE.**

The Executive Committee made arrangements at that time for three standing committees: (1) financial policies (Mr. C. M. Goethe, Sacramento, chairman); (2) educational policies (Dr. F. C. E. Mattison, Pasadena, chairman); (3) legislative needs (Dr. N. K. Foster, Oakland, chairman).

It is the purpose of these committees to make comparative studies of the methods employed by the component associations of the League in carrying on their work. The reports of these committees are to be used by the executive committee in formulating recommendations to the Board of Directors of the League upon uniform methods of administration.

#### **EXECUTIVE COMMITTEE MEETS IN LOS ANGELES.**

In the mean time the executive committee is organizing a provisional lecture bureau, and planning coöperative aid in scheduling and advertising the lectures of the component associations. In conference with the public health committee of the State Medical Society, it has been agreed that the latter shall perfect its county public health committees and shall provide a list of physicians who possess ability and experience in delivering interesting lectures, and who will agree to deliver four or more lectures during the year upon topics assigned by the League. The executive committee has districted the State and is supplementing the medical committees by the appointment of district committees on arrangements, program, and advertising. The State Board of Health has agreed to furnish lantern slides and other demonstration materials for lectures.



## HEALTH CONSERVATION IN MAGAZINE, NEWSPAPER AND BOOK.

*Announcement.*—One can scarcely pick up a popular magazine to-day that does not contain one or more articles on public and personal health. The articles appear under the most varied headings, and represent every phase of scientific and popular writing. Many of them are excellently written, full of interest, well illustrated, and adhere closely to the present conservative views of medical scientists; while others deserve condemnation from every point of view.

The California State Board of Health believes a great opportunity is being lost in not bringing these articles prominently to the attention of the citizens, and aiding them through helpful comments to select the best of them for reading. Hereafter the editor of the Bulletin will publish a brief bibliography of public health articles, and will abstract one or more of the best ones each month.

"*The Survey*" is filled every week with most valuable information on the general welfare work of the United States, and during the coming year the editors announce that especial attention will be given to public health matters.

*The California newspapers* are steadily preparing the way for effective enforcement of sanitary regulations through the large amount of space they are devoting to public health questions.

Owing to lack of space the magazines have not been fully reviewed this month, but the following articles are inserted as an illustration of the plan proposed:

**TUBERCULOSIS.**—*How I Have Fought Tuberculosis for Ten Years.* By Charles E. Astrup, in *Pacific Monthly*, of July.

*The Trend of Things.* A department in *The Survey* (week of July 9), devoted to reports on anti-tuberculosis movements, clean milk production, amelioration of child labor conditions, etc.

**CITY HEALTH PROBLEMS.**—*Oxygenizing a City; An Attempt to Make Two and a Quarter Million People Work and Play Under Sanitary Conditions.* By Burton J. Hendrick, in *McClure's Magazine*, of August. How Chicago got fresh air into its street cars, schools, and tenements, and became the best ventilated city in the United States.

*A City's Dream of a City.* By Ernest Poole, in *Everybody's Magazine*, of July. A study of molding cities to "suit humanity's needs," which discusses ways and means of conservation, the influence of scientific discoveries, and process of political and social reform.

*Making Over a City; The True Story of One That Was Lifted from Medieval Dirt and Ugliness to Health, Beauty and Civic Pride.* By J. Horace McFarland, President American Civic Association of Harrisburg, in August number of *The Delineator*.

*Conference of Forty-two New York Mayors.* Under department "The Common Welfare," in *The Survey*, week of July 9. Outlines discussions of New York State city officials on public health problems.

**HEALTH OF CHILDREN.**—*A Fighting Chance for the City Child.* By Rheta Childe Dorr, in *Hampton's Magazine*, of August. Urges charitable organizations to co-operate and work unitedly for the conservation of child health. Tells how Philadelphia interests the school children in baby's health problems, and how New York provides medical attendance and hygienic instruction for dwellers of the tenements. A carefully prepared article that should be widely read.



## DEPARTMENT REPORTS.

### REPORT OF BUREAU OF VITAL STATISTICS FOR JUNE.

GEORGE D. LESLIE, Statistician.

*Marriages.*—The marriages reported for June number 2,636 and, for an estimated State population of 2,056,190 in 1910, represent an annual rate of no less than 15.6 per 1,000 population, as compared with only 10.6 for May. In fact, the June total in 1910 is the highest marriage total reported for any month under the registration law of 1905, previous June totals having been as follows: 1909, 2,511; 1908, 2,251; 1907, 2,366; and 1906, 2,342.

The monthly totals were highest for the following counties: Los Angeles, 611; San Francisco, 432; Alameda, 314; Santa Clara, 121; Orange, 109; San Diego, 91; Marin, 90; Sacramento, 88; San Joaquin, 73; Fresno, 69; and San Bernardino, 58.

The aggregate for San Francisco and the other bay counties (Alameda, Contra Costa, Marin, and San Mateo) was 899.

*Births.*—For June there were reported 2,746 living births, representing an annual birth-rate of 16.2 per 1,000 population, as compared with 15.4 for the preceding month. The corresponding total for the same month the year before was 2,517.

The totals were highest for the following counties: Los Angeles, 684; San Francisco, 534; Alameda, 290; Santa Clara, 98; San Diego, 93; Fresno, 86; Sacramento, 81; San Bernardino, 76; Contra Costa, 69; and Riverside, 52.

Altogether 1,762 births were registered in the twenty-six freeholders' charter cities, the leading cities being as follows: San Francisco, 534; Los Angeles, 480; Oakland, 179; Berkeley, 70; San Diego, 66; Sacramento, 50; Fresno, 40; San Jose, 39; Pasadena, 31; Alameda, 27; and Long Beach and Riverside, each 25.

The aggregate for San Francisco and the transbay cities (Alameda, Berkeley, and Oakland) was 810, and for San Francisco and the other bay counties was 919. Similarly, the total for Los Angeles and neighboring chartered cities (Long Beach, Pasadena, and Santa Monica) was 540, and for the entire county was 684.

*Deaths.*—Exclusive of stillbirths, altogether 2,630 deaths were reported for June, this number including 209 delayed certificates for deaths in May or earlier months. The 2,630 deaths give an annual death-rate of 15.6, or the same as for May. The corresponding total for the same month last year was 2,536.

The June totals were highest for the following counties: Los Angeles, 580; San Francisco, 443; Alameda, 253; Santa Clara, 99; Fresno, 96; Sacramento, 86; San Bernardino, 80; San Joaquin, 79; Kern and San Diego, each 67; and Sonoma, 52.



There were altogether 1,449 deaths in the twenty-six chartered cities, the highest totals being as follows: San Francisco, 443; Los Angeles, 356; Oakland, 150; Sacramento, 52; San Diego, 51; Stockton, 47; Pasadena, 40; Fresno, 38; San Jose, 37; and Berkeley and San Bernardino, each 30.

The aggregate for the urban district (San Francisco and the transbay cities) was 643, and for the entire metropolitan area (San Francisco and the other bay counties) was 790. Similarly, the total for Los Angeles and neighboring chartered cities was 426, and for the whole county was 580.

*Causes of Death.*—For June there were reported 393 deaths from diseases of the circulatory system (heart disease, etc.) and 391 from various forms of tuberculosis, the per cent being the same, 14.9, in each case.

Other notable causes of death in June were: Diseases of the digestive system, 287; violence, 275; diseases of the nervous system, 248; diseases of the respiratory system, 199; Bright's disease and nephritis, 164; epidemic diseases, also 164; and cancer, 147.

The deaths from epidemic diseases were as follows: Typhoid fever, 54; whooping-cough, 41; measles, 18; diphtheria and croup, 17; and all other epidemic diseases, 34. Typhoid fever was the leading epidemic disease in June, as is usually the case, though whooping-cough caused more deaths than typhoid fever in each of the preceding four months.

The deaths from the three leading epidemic diseases reported for June were distributed by counties as follows:

TYPHOID FEVER.		WHOOPIING-COUGH.		MEASLES.	
Alameda	2	Alameda	7	Alameda	2
Butte	1	Butte	3	Fresno	3
Colusa	3	Contra Costa	1	Los Angeles	2
Fresno	5	El Dorado	1	Monterey	1
Humboldt	1	Fresno	2	Riverside	1
Imperial	1	Humboldt	1	San Benito	1
Kern	4	Kern	1	San Bernardino	2
Kings	2	Los Angeles	5	San Francisco	3
Los Angeles	8	Merced	1	Shasta	2
Modoc	1	Monterey	1	Stanislaus	1
Monterey	1	Nevada	2		
Orange	2	Placer	1	Total	18
Placer	1	San Benito	1		
Sacramento	1	San Bernardino	2		
San Bernardino	5	San Francisco	3		
San Diego	1	San Joaquin	1		
San Francisco	10	San Mateo	1		
Santa Clara	1	Santa Clara	2		
Stanislaus	2	Solano	1		
Tehama	1	Tehama	2		
Yolo	1	Yuba	2		
Total	54	Total	41		



*Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths for Current and Preceding Month, for California: June.*

Cause of Death.	Deaths: June.	Proportion per 1,000.	
		June.	May.
ALL CAUSES.....	2,630	1,000	1,000.0
Typhoid fever.....	54	20.5	9.9
Malarial fever.....	8	3.0	2.2
Measles.....	18	6.9	9.5
Scarlet fever.....	4	1.5	2.9
Whooping-cough.....	41	15.6	12.1
Diphtheria and croup.....	17	6.5	6.6
Influenza.....	1	0.4	1.5
Plague.....	1	0.4	.....
Other epidemic diseases.....	20	7.6	7.0
Tuberculosis of lungs.....	326	123.9	133.5
Tuberculosis of other organs.....	65	24.7	33.0
Cancer.....	147	55.9	59.4
Other general diseases.....	110	41.8	45.5
Meningitis.....	41	15.6	11.7
Other diseases of nervous system.....	207	78.7	72.6
Diseases of circulatory system.....	393	149.4	161.3
Pneumonia and broncho-pneumonia.....	151	57.4	71.5
Other diseases of respiratory system.....	48	18.3	19.8
Diarrhea and enteritis, under 2 years.....	121	46.0	34.1
Diarrhea and enteritis, 2 years and over.....	37	14.1	7.7
Other diseases of digestive system.....	129	49.1	47.3
Bright's disease and nephritis.....	164	62.4	64.4
Childbirth.....	29	11.0	11.0
Diseases of early infancy.....	89	33.8	35.6
Suicide.....	70	26.6	16.5
Other violence.....	205	77.9	73.7
All other causes.....	134	51.0	47.7

*Geographic Divisions.*—Data for geographic divisions, including the metropolitan area, or “Greater San Francisco,” are as follows:

*Deaths from Main Classes of Diseases, for Geographic Divisions: June.*

Geographic Division.	DEATHS: JUNE.										
	All Causes.....	Epidemic Diseases.....	Tuberculosis (All Forms).....	Cancer.....	Diseases of Nervous System.....	Diseases of Circulatory System.....	Diseases of Respiratory System.....	Diseases of Digestive System.....	Bright's Disease and Nephritis.....	Violence.....	All Other Causes.....
THE STATE.....	2,630	164	391	147	248	393	199	287	164	275	362
Northern California.....	334	27	38	20	39	51	16	35	16	51	41
Coast counties.....	160	4	20	12	24	37	3	14	9	17	20
Interior counties.....	174	23	18	8	15	14	13	21	7	34	21
Central California.....	1,461	94	191	84	114	230	130	169	88	167	194
San Francisco.....	443	25	59	35	23	85	45	47	28	40	56
Other bay counties.....	347	17	37	15	31	56	46	39	27	35	44
Coast counties.....	173	11	30	8	17	27	14	15	11	20	20
Interior counties.....	498	41	65	26	43	62	25	68	22	72	74
Southern California.....	835	43	162	43	95	112	53	83	60	57	127
Los Angeles.....	580	28	116	30	60	76	32	57	42	41	98
Other counties.....	255	15	46	13	35	36	21	26	18	16	29
Northern and Central California.....	1,795	121	229	104	153	281	146	204	104	218	235
Metropolitan area.....	790	42	96	50	54	141	91	86	55	75	100
Rural counties.....	1,005	79	133	54	99	140	55	118	49	143	135



## REPORT OF PURE FOODS AND DRUGS LABORATORY FOR JUNE.

PROFESSOR M. E. JAFFA, Director.

The following is a list of the persons accused, the foods found to be adulterated or mislabeled, and the nature of the offenses, which were included in the reports of the Director of the State Laboratory to this Board for the months of May and June. These persons were afforded an opportunity to be heard before this Board as provided in said act, and after such hearing, the findings of the Director being sustained, these cases were referred to the district attorneys of the several counties for prosecution:

Certificate No.	Material.	Violation.	Name of Dealer.	Locality.
946	Pickles -----	Mislabeled. Bezoates-----	Swezen-Sager Co. Inc. ....	San Jacinto
948	Vinegar -----	Mislabeled and adulterated. Artificial color, below standard-----	F. Green-----	Los Angeles
949	Vinegar -----	Mislabeled. Below standard-----	Mrs. J. Jensen-----	Los Angeles
950	Vinegar -----	Adulterated. Artificial color-----	Hook Bros. & Co. ....	Perris
952	Vinegar -----	Mislabeled. Below standard-----	P. Marchetti & E. Portalupi-----	San Francisco
953	Vinegar -----	Mislabeled. Below standard-----	Vanaglia & Co. ....	San Francisco
954	Wine vinegar-----	Mislabeled. Below standard-----	Ferrea & Digrazia-----	San Francisco
955	Apple cider-----	Mislabeled. Below standard-----	H. G. Reed-----	Oroville
957	Extract, lemon-----	Mislabeled. Below standard. Lemon oil-----	Morris & Banes-----	Ventura
958	Chili sauce-----	Mislabeled. Benzoates-----	Fuller & Co. ....	Palo Alto
959	Catsup-----	Mislabeled. Benzoates-----	Yung Wing-----	Los Angeles
960	Catsup-----	Mislabeled. Benzoates-----	Me Hong-----	Los Angeles
962	Pickles-----	Mislabeled. Benzoates-----	Ohlsen & Rudiger-----	San Francisco
963	Sausage, pork and beef-----	Mislabeled. Sulphur dioxide-----	C. T. Gilger (Unique Market)-----	Petaluma
964	Malted milk-----	Mislabeled substitute-----	S. Christopher-----	Los Angeles
965	Paregoric-----	Mislabeled. Ethyl alcohol and opium derivatives-----	Murray's Drug Store-----	Corona
966	Paregoric-----	Mislabeled. Ethyl alcohol and opium derivatives-----	E. S. Castle-----	Los Angeles
967	Tincture of myrrh-----	Mislabeled. Ethyl alcohol-----	A. E. Teaque-----	Los Angeles
968	Paregoric-----	Mislabeled. Ethyl alcohol and opium derivatives-----	J. D. Keir-----	Hueneme
969	Tincture of arnica-----	Mislabeled. Ethyl alcohol-----	Ed Schmalzried (Red Cross Drug Co.)-----	Los Angeles
970	Whiskey compound-----	Adulterated. Substituted water-----	G. Piuma-----	Los Angeles
971	Spirits of camphor-----	Mislabeled. Ethyl alcohol-----	Lynn Boyd-----	Elsinore
972	Spirits of camphor-----	Mislabeled. Ethyl alcohol-----	Ed Schmalzried-----	Los Angeles



The following U. S. Food Inspection Decision has just been received at the State Laboratory:

FOOD INSPECTION DECISION 122.

THE LABELING OF PORT AND SHERRY WINES PRODUCED IN THE UNITED STATES.

A hearing was held on March 21, before the Secretary of Agriculture and the Board of Food and Drug Inspection on the labeling of wines produced in California, which for many years have been known as "California Port" and "California Sherry," respectively.

It is the view of the Department that the terms "Port" and "Sherry" without qualification are properly applied only to the products from Portugal and Spain, respectively, but it is held that domestic ports and sherries are not misbranded if the terms "Port" or "Sherry," as the case may be, are qualified by the name of the State where the wine is produced.

NOTICES OF JUDGMENTS.

The following notices have been received since the publication of the last Bulletin. Full copies of the different notices may be obtained upon application to the State Laboratory, Berkeley, California:

*Notice of Judgment No. 324.*—Syrup, "Georgia's Cane Wilder's Uniform Brand Syrup," adulteration and misbranding of. False and misleading statement. Contained corn syrup.

*Notice of Judgment No. 325.*—Syrup, "Aunt Jemima's Sugar Cream, a Blend of Rock Candy and Maple Syrup Cream," misbranding of. Adulterated. False and misleading statement. Contained glucose.

*Notice of Judgment No. 326.*—"Celery Cola," adulteration and misbranding of. Contained caffeine, cocaine and cocaine derivatives. (Soft drink.)

*Notice of Judgment No. 327.*—"Gin-Seng-Gin"—a drug, misbranding of. Misleading and deceptive statements. A domestic product. Contains no gin; only trifle of phosphate.

*Notice of Judgment No. 328.*—Fruit Syrups, adulteration and misbranding of. Imitation syrups and flavors used; artificial coloring.

*Notice of Judgment No. 329.*—Drug "Dr. Kohler's Antidote," misbranding of. Alleged Headache Cure. False and misleading statements.

*Notice of Judgment No. 330.*—Canned Apricots, misbranding of. Short weight.

*Notice of Judgment No. 331.*—Cream, adulteration of. Lack of milk fat.

*Notice of Judgment No. 332.*—Butter, misbranding of. False and misleading statement.

*Notice of Judgment No. 333.*—Drug, Laudanum, misbranding of. Quantity and proportion of alcohol, morphine and opium contained therein not mentioned.

*Notice of Judgment No. 334.*—Oats, "100 lbs. Miller's Fancy White Clipped Oats," misbranding of. Misleading and false statement. Contained mixture of white oats, barley and other grains.

*Notice of Judgment No. 335.*—Milk, adulteration of. Water present.

*Notice of Judgment No. 336.*—Cream, adulteration of. Butter fat wholly or partly abstracted.

*Notice of Judgment No. 337.*—Turpentine, adulteration and misbranding of. Misleading and false statements. Contained mineral oil.

*Notice of Judgment No. 338.*—Milk, adulteration of. Cream abstracted wholly or in part.

*Notice of Judgment No. 339.*—Flavoring Extracts, adulteration and misbranding of. False and misleading statements. Contained dilute alcohol solution of citral; artificial coloring and wood alcohol.

*Notice of Judgment No. 340.*—Olive-oil, "Prodotti Di Olio Sopraffino La Favorite Brand." Contained cotton-seed.

*Notice of Judgment No. 341.*—Roquefort Cheese, misbranding of. Not made from goat's milk and not imported.

*Notice of Judgment No. 342.*—Canned Corn, misbranding of. False and misleading statements. Incorrect weights.

*Notice of Judgment No. 343.*—Food "Concreta Butterol," misbranding of. False and misleading statements.



*Notice of Judgment No. 344.*—Neufchatel Cream Cheese, adulteration and misbranding of. False and misleading statements. Made from skimmed milk and starch.

*Notice of Judgment No. 345.*—Drug-Extract of Damiana—misbranding of. False and misleading statements. Contained cocaine.

*Notice of Judgment No. 346.*—Drug—Headache Cure—misbranding of. False and misleading statements. Acetanilid in large quantities.

*Notice of Judgment No. 347.*—Milk, adulteration of. Water present.

*Notice of Judgment No. 348.*—Olive Oil, misbranding of. Contained cotton-seed oil.

*Notice of Judgment No. 349.*—Whiskey, misbranding of. False and misleading statement. Contained rectified product.

*Notice of Judgment No. 350.*—Whiskey, misbranding of. False and misleading statement. A rectified article combined with grain distillate.

*Notice of Judgment No. 351.*—Butter, misbranding of. False statements.

*Notice of Judgment No. 352.*—Honey, misbranding of. False and misleading statement. Short weight.

*Notice of Judgment No. 353.*—Whiskey, misbranding of. Misleading and deceptive statements. Contained compound of whiskey and grain distillate.

*Notice of Judgment No. 354.*—Rye Flour, adulteration of. Wheat flour substituted.

*Notice of Judgment No. 355.*—Coffee, misbranding of. False and misleading statement. Contained cheap grade.

*Notice of Judgment No. 356.*—Currants, misbranding of. False and misleading statement. Short weight.

*Notice of Judgment No. 357.*—Witch-Hazel, misbranding of. Contained alcohol. False and misleading statements.

*Notice of Judgment No. 358.*—Corn Meal, misbranding of. Short weight.

*Notice of Judgment No. 359.*—Egg Product, desiccated, adulteration of. Contained filthy, putrid matter.

*Notice of Judgment No. 360.*—Olive Oil, "Prodotti di Olii Oilo Soprafino O. S. Brand Olive Oil and Salad Oil," misbranding of. Contained cotton-seed oil.

*Notice of Judgment No. 361.*—Whiskey, misbranding of. False and misleading statements. Rectified article compounded with grain distillate.

*Notice of Judgment No. 362.*—Egg Product, desiccated, adulteration of. Contained filthy, putrid matter.

*Notice of Judgment No. 363.*—Baking Powder, misbranding of. False and misleading statement. Short measure.

*Notice of Judgment No. 364.*—Baking Powder, misbranding of. False and misleading statement. Short weight.

*Notice of Judgment No. 365.*—Canned Fish, "Broiled California Mackerel," misbranding of. Contained sardines.

*Notice of Judgment No. 366.*—Drug, "Mother's Friend," misbranding. False and misleading statements.

*Notice of Judgment No. 367.*—Raisins and Evaporated Apples, adulteration of. Filthy and putrid condition.

*Notice of Judgment No. 368.*—Peanuts, adulteration of. Filthy condition, infested with worms.

*Notice of Judgment No. 369.*—Canned Tomatoes, "Stanley Brand Solid Meat Tomatoes First Quality," misbranding of. False and misleading statements.

*Notice of Judgment No. 370.*—Milk, adulteration of. Contained water.

*Notice of Judgment No. 371.*—Coffee, misbranding of. False and misleading statements. Distinctive name of another article used.

*Notice of Judgment No. 372.*—Cherry Syrup, "Allen's Red Tame Cherry," misbranding of. False and misleading statement. Contained little cherry; colored with coal-tar.

*Notice of Judgment No. 373.*—Vinegar, misbranding of. False and misleading statements. Contained acetic acid and unfermented apple juice, artificially colored.

*Notice of Judgment No. 374.*—Flour, misbranding of. False and misleading statements.

*Notice of Judgment No. 375.*—Water, "Sussus Wasser," misbranding of. False and misleading statement.

*Notice of Judgment No. 376.*—Maple Syrup, misbranding of. False and misleading statement. Composed of refined cane sugar and flavored with extract of maple wood.

*Notice of Judgment No. 377.*—Frozen Egg Product, adulteration of. Contained filthy, putrid matter.



*Notice of Judgment No. 378.*—Oats, adulteration of. Substitution of barley.

*Notice of Judgment No. 379.*—Oats, adulteration and misbranding of. Substitution of barley, and short weight.

*Notice of Judgment No. 380.*—Strawberry Extract, "Newton's Very Best Extract Strawberry," misbranding of. Artificial extract.

*Notice of Judgment No. 381.*—Oats, adulteration of. Substitution of barley.

*Notice of Judgment No. 382.*—Bleached Flour, adulteration and misbranding of.

*Notice of Judgment No. 383.*—Coffee, adulteration of.

*Notice of Judgment No. 384.*—Maple Syrup Blend, "Aunt Jemima's Sugar Cream," adulteration and misbranding of. Mixed with glucose.

*Notice of Judgment No. 385.*—White Oats, adulteration of. Barley added.

*Notice of Judgment No. 386.*—Olive Oil, adulteration and misbranding of. Contained cotton-seed oil.

*Notice of Judgment No. 387.*—Coffee, misbranding of. False statement of locality.

*Notice of Judgment No. 388.*—Tomato Catsup, adulteration and misbranding of. Contained filthy, decomposed, and putrid vegetable substance.

*Notice of Judgment No. 389.*—Vanilla Extract, adulteration and misbranding of. Substitution of vanillin and artificially colored. Misleading statements.

*Notice of Judgment No. 390.*—Powdered Colocynth, adulteration and misbranding of. Below standard in strength and quality.

*Notice of Judgment No. 391.*—Gluten Feed, misbranding of. False statement as to per cent protein.

*Notice of Judgment No. 392.*—Telephone Headache Tablets, misbranding of a drug. Contained acetanilid, which was not stated.

*Notice of Judgment No. 393.*—Oil of Lemon, misbranding of. Under weight.

*Notice of Judgment No. 394.*—Vinegar, adulteration and misbranding of. Dilute solution of acetic acid artificially colored.

*Notice of Judgment No. 395.*—Sardines, adulteration. Contained filthy, decomposed and putrid animal substance.

*Notice of Judgment No. 396.*—Corn Flour, adulteration of. Product in filthy condition, and infested with worms.

*Notice of Judgment No. 397.*—Olive Oil, misbranding of. Largely cotton-seed oil.

*Notice of Judgment No. 398.*—Vinegar, adulteration and misbranding of. Dilute acetic acid containing reducing sugars. Prepared in imitation of cider vinegar.

*Notice of Judgment No. 399.*—Vinegar, adulteration and misbranding of. Dilute acetic acid and cider vinegar artificially prepared.

*Notice of Judgment No. 400.*—Stock Feed "Oneida," misbranding of, and false and misleading statements. Label stated that it contained, among other ingredients, ground corn; whereas, it contained no ground corn.



## REPORT OF HYGIENIC LABORATORY FOR JUNE.

W. A. SAWYER, M.D., Director.

There were 148 specimens sent to the laboratory for examination in June. These were received from 61 physicians in 37 localities in the State. The following tabulation summarizes these specimens according to the diseases for which they were an aid in diagnosis, and gives the results of the laboratory examination:

	Positive.	Negative.	Total.
Diphtheria .....	41	29	70
Malaria .....	0	2	2
Tuberculosis .....	12	19	31
Typhoid Fever .....	14	16	30
Rabies .....	2	0	2
Miscellaneous .....	2	2	4
Water (suspected of contamination by sewage) .....	1	8	9
Total .....			148

Arranged by counties in the order of highest number of specimens sent in, Alameda County ranks first with 37, Sacramento next with 27, Placer with 19, Kern County with 8, the remaining number being unequally distributed in small numbers among 21 counties as follows: eight northern California counties 22 specimens, six coast counties 9 specimens, four San Joaquin counties 17 specimens, three southern California counties 5 specimens.

The Alameda County specimens were sent in by 17 physicians, from Berkeley (31), Oakland (5), and Livermore (1); and included diphtheria 9, typhoid fever 11, tuberculosis 8, miscellaneous 3. No general outbreak of communicable diseases is represented by this list.

The specimens from Sacramento, with the exception of one diphtheria from Folsom, were from Elk Grove, and represent an outbreak from diphtheria, which is discussed in the report of the Bureau of Epidemiology. The specimens from Auburn were, with two exceptions, from one patient having diphtheria. The Kern County specimens were obtained from suspected typhoid fever patients in Maricopa and McKittrick.

The diphtheria case at Auburn deserves special mention. Mr. ——— of that city, a groceryman, developed diphtheria. During convalescence Mr. ——— desired cultures to be taken frequently in the hope that his throat and mucous membranes might show freedom from the bacilli, thus enabling him to return to his business at an early date without endangering the public. Unfortunately the cultures continued positive even after the expiration of three weeks, which was a period of time the local board of health had been accustomed to arbitrarily prescribe for quarantine of diphtheria cases in which no attempt to obtain cultures had been made. During the fourth week two negative cultures were reported. In accordance with the ruling of the State Board of Health this would have released him, but, through a misunderstanding, another culture was taken and proved to be positive. Mr. ——— had thus complied with both the local and the State regulations regarding the release dates for diphtheria, and still showed by the laboratory findings that he would have been a source of possible danger to his patrons had he returned to his store. Fortunately both Mr. ——— and his physician were desirous of taking every precaution to protect the public. No further positive



cultures were obtained and Mr. ———'s throat and nasal passages being clear, he was released a few days later.

The case illustrates very clearly the fact that the quarantine regulations in general vogue are simply minimum requirements which are adequate for the great majority of cases, but which occasionally fail to protect the public.

## REPORT OF BUREAU OF EPIDEMIOLOGY FOR JUNE.

WILLIAM F. SNOW, M.D., Director.

Reports of the presence of communicable diseases have been received during the month of June from the following localities in the State:

This list is incomplete and should be interpreted as evidence of communities that are actively obeying the laws which relate to reporting communicable diseases, and are making efforts to discover and control such diseases, rather than as evidence of communities having a large amount of preventable illness.

Table I. Morbidity Statistics for June, 1910.

Counties.	Typhoid.	Measles.	Scarlet Fever.	Whooping Cough.	Diph- theria.	Smallpox.
Alameda—						
Berkeley -----	1	1	2	1	3	-----
Amador -----		2				2
Colusa—						
Arbuckle -----	1					
Colusa -----	1					
Williams -----	18					
Rural -----	1					
Contra Costa—						
Richmond -----	1				1	
Pinole -----		1				
Concord -----			1			
Byron -----					1	
Rural -----				37		
Fresno—						
Holland Colony -----			1			
Maliga -----		2				
Parlier -----					1	
Peters' Addition -----		1				
West Park -----		2				
Blackstone Avenue -----		1				
Sanger -----				6		
Rural -----		1	2			
Fresno City -----	3	18	1			
Glenn—						
St. John -----		3				
Chrome -----			3			
Los Angeles—						
Alhambra -----	13					
Glendale -----	1					
Pasadena -----		1	4		4	
Pomona -----				2	2	
Long Beach -----					1	5
Santa Monica -----					1	
Nevada—						
Truckee -----	2					1
Nevada City -----		3				
Grass Valley -----				20		
Hobart Mills -----					1	
Orange—						
Santa Ana -----		3				
Riverside—						
Riverside City -----	1	14	2	13	3	
Sacramento—						
Bruceville -----					3	
Folsom -----	1					



Table I. Morbidity Statistics for June, 1910—Continued.

Counties.	Typhoid.	Measles.	Scarlet Fever.	Whooping Cough.	Diph- theria.	Smallpox.
San Bernardino—						
San Bernardino	4		2	2		
San Diego—						
San Diego			2		5	
San Francisco	44	106	33		33	1
San Joaquin—						
Lodi		2		2		
Stockton					2	
Santa Barbara—						
Santa Barbara	1	86			1	
Santa Clara—						
Sunnyvale			5			
Sterling			5			
East San José					1	
Santa Cruz—						
Santa Cruz		2	4			
Shasta—						
Redding		Epidem.				
Anderson					2	
Siskiyou—						
Hawkinsville		Epidem.				
McCloud			3			
Sonoma—						
Petaluma			2			
Santa Rosa		4			1	
Stanislaus—						
Modesto					1	
Totals	93	253	72	83	67	9

In order to emphasize the explanatory statement printed over the foregoing table the following supplementary table of deaths is given:

Experience shows that usually only a small percentage of persons becoming ill from communicable diseases die from them. Therefore, the following list of deaths would argue that there must have been other cases in these same communities. In any event it is obvious, since these localities do not appear at all in the table of reported communicable diseases, that the local health officer and the State Board of Health have not been kept fully informed.

Table II. Deaths for which no Morbidity Statistics were previously sent in.

Counties.	Typhoid.	Measles.	Scarlet Fever.	Whooping Cough.	Diph- theria.
Alameda—					
Alameda	1				
Hayward		1			
Oakland	1	1		1	1
Rural				1	
Butte—					
Chico	1			1	
Gridley				1	
Rural				1	
Humboldt—					
Rural	1				
Imperial—					
Imperial City	1				
Kern—					
Bakersfield	3				
Kern				1	
Rural	1				
Kings—					
Hanford	1				
Lemoore	1				
Los Angeles—					
Watts	1				



Table II. Deaths for which no Morbidity Statistics were previously sent in—*Con'd*

Counties.	Typhoid.	Measles.	Scarlet Fever.	Whooping Cough.	Diph- theria.
Marin—					
Mill Valley					1
San Rafael					1
Merced—					
Merced				1	
Modoc—					
Rural	1				
Monterey—					
Monterey	1	1			
Rural				1	
Orange—					
Anaheim	2				
Placer—					
Roseville				1	
Rural	1				
San Benito—					
Hollister		1			
Rural				1	
Santa Clara—					
Mayfield				1	
San José				1	
Stanislaus—					
Modesto	2				
Rural		1			
Solano—					
Benicia					1
Rural				1	
Yolo—					
Rural	1				
Yuba—					
Marysville				1	
Rural				1	
Totals	20	5		15	4

During the month the Bureau has been called upon to give aid in investigating the appearance of epidemic diseases in a number of counties, but owing to lack of space the details are omitted for this issue.

## REPORT OF BUREAU OF PUBLIC HEALTH INFORMATION.

RAYMOND RUSS, M.D., Director.

This bureau was established by action of the State Board of Health, July 9, 1910, and its first official report will appear in the August issue of the Bulletin. The work assigned to it has hitherto been carried on by special assignment to various members of the Board's staff. The secretary's announcement in this issue summarizes the purposes for which it has been created.



## PARTIAL LIST OF PUBLIC HEALTH ORGANIZATIONS OF CALIFORNIA.

### (A). California Public Health League.

President, Mr. A. Bonnheim, Sacramento.

Secretary, Dr. William F. Snow, Sacramento.

NOTE.—The League is made up of the Associations indicated by a (\*) in the list given below. The purpose of the League is to serve as a clearing-house for all the common interests of the societies composing its membership. All correspondence should be addressed to the Secretary, Sacramento, California.

### (B). Organizations Which Are Active Along Special Lines of Health Conservation.

#### I. Associations for the Prevention of Tuberculosis.

1. \*California State Association for the Study and Prevention of Tuberculosis. President, Dr. F. C. E. Mattison, Pasadena; Secretary, Dr. George H. Kress, Bradbury Block, Los Angeles.

2. Affiliated Branch Societies: Alameda County, Long Beach, Los Angeles, Monrovia, Pasadena, Redlands, Sacramento, San Diego, San Francisco, Santa Ana, Santa Barbara, Sierra Madre, Stockton.

#### II. Associations for the Prevention of Syphilis and Gonococcus Infections.

1. \*California State Association for the Study and Prevention of Syphilis and Gonococcus Infection. President, Dr. John C. Spencer, Butler Building, San Francisco; Secretary, Dr. R. A. Archibald, Department of Health, Oakland.

#### III. Associations for the Improvement of Milk Supplies.

1. \*California State Association of Medical Milk Commissions. Dr. Lewis Sayre Mace, Chairman Executive Committee.

2. Affiliated branch commissions: San Francisco, Los Angeles, Oakland, San Jose, Sacramento, Santa Barbara.

3. San Francisco Milk Improvement Association.

#### IV. Associations for the Improvement of Child Hygiene.

1. \*California Playground Association. President, O. K. Cushing, First National Bank Building, San Francisco; Secretary, C. E. Hudspeth, 781 Fifty-ninth Street, Oakland.

2. Local associations: Los Angeles, Oakland, Sacramento, Fresno, San Jose.

#### V. Miscellaneous Associations Carrying on Important Public Health Work.

1. \*California Branch Red Cross. Subdivisions: San Francisco, Oakland, Los Angeles, Stockton, Sacramento, Napa.

2. \*California Federation of Women's Clubs.

3. \*California Teachers' Association.

4. \*California Press Association.

5. \*State Charities Aid Association.

6. Anti-Mosquito Associations.

7. Association of Collegiate Alumnae.

8. Civic Department, California Club, San Francisco.

This list is incomplete and will be changed each month as corrections and additions are sent in.

Names of officers and information concerning these associations will be sent on application to the State Associations listed, or to the Secretary of the State Board of Health.



## LIST OF COUNTY HEALTH OFFICERS.

<i>County.</i>	<i>Health Officer.</i>	<i>Address.</i>
Alameda .....	Dr. C. L. McKown.....	Niles
Alpine .....	.....	.....
Amador .....	Dr. E. E. Endicott.....	Jackson
Butte .....	Dr. L. Q. Thompson.....	Oroville
Calaveras .....	Dr. E. W. Weirich.....	Angels Camp
Colusa .....	Dr. W. T. Rathbun.....	Colusa
Contra Costa .....	Dr. J. Wallace DeWitt.....	Antioch
Del Norte .....	.....	.....
El Dorado .....	Dr. S. H. Rantz.....	Placerville
Fresno .....	Dr. G. L. Long.....	Fresno
Glenn .....	Dr. J. A. Randolph.....	Willows
Humboldt .....	Dr. E. V. Falk.....	Eureka
Imperial .....	Dr. E. E. Patten.....	Imperial
Inyo .....	Dr. I. J. Woodin.....	Independence
Kern .....	Dr. W. S. Fowler.....	Bakersfield
Kings .....	Dr. W. H. Miller.....	Hanford
Lake .....	Dr. W. E. Upton.....	Kelseyville
Lassen .....	Dr. E. C. Houston.....	Bieber
Los Angeles .....	Dr. O. R. Stafford.....	3754 Vermont ave., Los Angeles
Madera .....	Dr. Mary R. Butin.....	Madera
Marin .....	Dr. J. H. Kuser.....	Novato
Mariposa .....	Dr. F. L. Wright.....	Mariposa
Mendocino .....	Dr. John S. Hogshead.....	Ukiah
Merced .....	Dr. W. E. Lilley.....	Merced
Modoc .....	Dr. John Stile.....	Alturas
Mono .....	.....	.....
Monterey .....	Dr. Garth Parker.....	Salinas
Napa .....	Dr. Adolph J. Kahn (County Physician).....	Napa
Nevada .....	Dr. John T. Jones.....	Grass Valley
Orange .....	Dr. C. D. Ball.....	Santa Ana
Placer .....	Dr. G. H. Fay.....	Auburn
Plumas .....	Dr. G. B. Lasswell.....	Quincy
Riverside .....	Dr. George E. Tucker.....	Riverside
Sacramento .....	Dr. Hugh Beattie.....	Elk Grove
San Benito .....	Dr. R. G. Curtis.....	Hollister
San Bernardino .....	Dr. D. C. Strong.....	San Bernardino
San Diego .....	.....	.....
San Francisco .....	Dr. W. F. McNutt, Jr.....	San Francisco
San Joaquin .....	Dr. R. B. Knight.....	Stockton
San Luis Obispo.....	Dr. H. M. Cox.....	San Luis Obispo
San Mateo .....	Dr. W. G. Beattie.....	Colma
Santa Barbara .....	Dr. J. C. Bainbridge.....	Santa Barbara
Santa Clara .....	Dr. Wm. Simpson.....	San Jose
Santa Cruz .....	.....	.....
Shasta .....	Dr. F. Stabel.....	Redding
Sierra .....	Dr. R. B. Davy.....	Downieville
Siskiyou .....	Dr. F. J. McNulty (County Physician).....	Yreka
Solano .....	Dr. S. G. Bransford.....	Suisun
Sonoma .....	Dr. S. S. Bogle.....	Santa Rosa
Stanislaus .....	Dr. F. R. De Lappe.....	Modesto
Sutter .....	Dr. J. McFadyen.....	Yuba City
Tehama .....	Dr. A. P. Tarter.....	Tehama
Trinity .....	Dr. D. B. Fields.....	Weaverville
Tulare .....	Dr. F. A. Coombs.....	Visalia
Tuolumne .....	Dr. C. E. Congdon.....	Jamestown
Ventura .....	Dr. A. A. Maulhardt.....	Oxnard
Yolo .....	Dr. A. E. Blevins.....	Woodland
Yuba .....	Dr. J. H. Barr.....	Marysville



## PARTIAL LIST OF CITY HEALTH OFFICERS.

Alameda.....	Dr. L. W. Stidham	Merced.....	Dr. C. H. Castle
Alhambra.....	Dr. F. E. Corey	Mill Valley.....	Capt. M. Staples
Alturas.....	Dr. John Stile	Modesto.....	Dr. F. R. De Lappe
Anaheim.....	Dr. J. L. Beebe	Mojave.....	Mr. A. Smith
Antioch.....	E. C. Worrell	Monrovia.....	Dr. R. D. Adams
Auburn.....	Dr. R. F. Rooney	Monterey.....	Martin Birks
Azusa.....	Dr. S. A. Ellis	Morgan Hill.....	Dr. D. W. Watt
Berkeley.....	Dr. J. J. Benton	Mountain View.....	Dr. Philo Hull
Biggs.....	Dr. B. Caldwell	Napa.....	J. D. Treadway
Black Diamond.....	Dr. F. S. Gregory	National City.....	Dr. Theo. F. Johnson
Bakersfield.....	J. E. Yancey	Nevada City.....	Hugh Murchie
Chico.....	G. H. Taylor	Oakland.....	Dr. E. N. Ewer
Chino.....	Dr. P. M. Savage	Ontario.....	Dr. C. S. Orr
Coalinga.....	Dr. H. C. Warren	Orange.....	Dr. F. L. Champline
Colton.....	Dr. J. A. Champion	Oroville.....	Dr. W. F. Gates
Colusa.....	Dr. W. T. Rathbun	Oxnard.....	Dr. Ralph W. Avery
Corona.....	Dr. P. F. Page	Pacific Grove.....	Dr. H. N. Yates
Coronado.....	Dr. Raffaele Lorini	Palo Alto.....	Dr. T. M. Williams
Doris.....	Dr. A. A. Atkinson	Pasadena.....	Dr. Stanley P. Black
Dixon.....	Dr. R. L. Rierson	Petaluma.....	Dr. R. B. Duncan
East San Jose.....	Dr. W. A. Low	Placerville.....	Robert L. Crocker
Elsinore.....	Dr. Hugh Walker	Pomona.....	Dr. T. J. Wilson
Econdido.....	Dr. David Crise	Piedmont.....	Geo. T. Burtchael
Etna.....	Dr. W. H. Haines	Randsburg.....	Mr. E. B. McGinnes
Eureka.....	Dr. W. L. Perrott	Redding.....	L. D. Poole
Fairfield.....	Dr. S. G. Bransford	Redlands.....	Dr. J. M. Wheat
Ferndale.....	Dr. L. Michael	Redondo Beach.....	Dr. D. R. Hancock
Fort Jones.....	Thos. Bransom	Richmond.....	Dr. Chas. R. Blake
Fresno.....	Dr. Geo. H. Aiken	Riverside.....	Dr. Thos. R. Griffith
Gilroy.....	Dr. Jonas Clark	Sacramento.....	Dr. Wm. K. Lindsay
Glendale.....	R. E. Chase	Salinas.....	S. A. McCollum
Grass Valley.....	Dr. C. P. Jones	San Bernardino.....	Dr. J. G. Ham
Hayward.....	Dr. F. W. Browning	San Diego.....	Dr. F. H. Mead
Healdsburg.....	Dr. O. C. Hueb	San Francisco.....	Dr. W. F. McNutt, Jr.
Hermosa Beach.....	H. Vetter	San Jose.....	Dr. A. L. Cothran
Hollywood.....	E. O. Palmer	San Jacinto.....	Charles Long
Huntington Park.....	Dr. W. Thompson	Santa Ana.....	Dr. J. I. Clark
Kernville.....	Mr. J. W. Sumner	Santa Barbara.....	Dr. T. A. Stoddard
Lakeport.....	Dr. H. P. Stippe	Santa Cruz.....	Dr. C. H. Anderson
Lindsay.....	Dr. Walter W. Tourtillott	Santa Monica.....	Dr. W. H. Parker
Livermore.....	Dr. H. G. McGill	Santa Rosa.....	Dr. Jackson Temple, Jr.
Lodi.....	Dr. F. W. Colman	Sisson.....	Dr. L. Gouzuett
Long Beach.....	Dr. W. H. Newman	South Pasadena.....	Dr. C. A. Whiting
Los Angeles.....	Dr. L. M. Powers	Stockton.....	Dr. S. W. R. Langdon
Los Gatos.....	Dr. Elenor S. Yelland	Taft.....	Mr. J. W. Bursell
Madera.....	Dr. Mary R. Butin	Turlock.....	Dr. E. L. Clough
Maricopa.....	Mr. Thad Cheeney	Vallejo.....	Dr. F. T. Bond
Martinez.....	Dr. E. E. Brown	Watsonville.....	Dr. F. H. Koepke
McKittrick.....	Mr. G. M. Chitwood	Yreka.....	Dr. A. J. Collar



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